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ORIGINAL PAPER

Mental health, social support, and HIV-related sexual risk behaviors among HIV-negative adolescent sexual minority males: three U.S. cities, 2015

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Abstract

We examined the association between mental health issues, social support, and HIV among adolescent sexual minority males (SMM), who are disproportionally affected by HIV. National HIV Behavioral Surveillance among Young Men Who Have Sex with Men (NHBS-YMSM) data among SMM aged 13–18 years were collected in three cities (Chicago, New York City, and Philadelphia). Separate log-linked Poisson regression models were used to estimate associations between mental health issues and social support (general and family), and 3 HIV-related sexual risk behavior outcomes: past-year condomless anal intercourse (CAI) with a male partner, past-year sex with ≥ 4 partners, and first vaginal or anal sex before age 13. Of 547 adolescent SMM, 22% reported ever attempting suicide and 10% reported past-month suicidal ideation. The majority (52%) reported depression and anxiety. Thirty-nine percent reported CAI, 29% reported ≥ 4 sex partners and 22% reported first sex before age 13. Ever attempting suicide, suicidal ideation, and depression and anxiety were associated with CAI. Separately, ever attempting suicide and lack of family support were associated with ≥ 4 sex partners. None of the mental health or support measures were associated with having sex before age 13. General social support was not associated with any sexual risk behaviors. Mental health issues are common among adolescent SMM and associated with sexual risk behaviors. Including mental health support in comprehensive HIV prevention for adolescent SMM could potentially reduce HIV risk in this population.

Keywords Adolescent sexual minority males · Mental health · HIV risk

Introduction

Adolescent sexual minority males (SMM)—young men 13–24 years of age who identify as gay, bisexual, or who have sexual contact with persons of the same or both sexes—are disproportionally affected by HIV. In 2016, 22% of men who have sex with men (MSM) diagnosed with HIV were between 13 and 24 years of age [1]. With respect to race and ethnicity, 55% of MSM diagnosed with HIV who were aged 13–24 years were black or African American (hereafter referred to as black) and 24% were Hispanic/Latino [1].

These diagnoses are driven in part by sexual risk behaviors, which in turn, are influenced by a variety of risk and protective factors. For adolescent SMM, these factors may include mental health issues and social support. Mental health issues are prevalent among adolescent SMM [2, 3]. In previous research, adolescent SMM reported a higher

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prevalence of suicide attempts [4], suicidal ideation [5, 6], depression [3, 6], and anxiety [7] compared to heterosexual youth. While the prevalence of suicidal ideation and attempts are high among this population, there is limited research examining their association with sexual risk behaviors [4, 8]. Anxiety, operating as a mediator between suicidal ideation and sexual risk behaviors, is associated with increased sexual risk behaviors [7]. Additionally, there is some evidence that among adult SMM there may be a non-linear association between depression and anxiety and sexual risk behaviors [9, 10]. Specifically, researchers have found that there may be a "quadratic effect," meaning that while depression and anxiety are associated with increased risk tasking at lower levels, once they increase beyond a certain threshold they may become protective against sexual risk taking due to social contact avoidance and self-imposed isolation [9, 11]. However, it remains unknown if this previous research among adult populations can be generalized to adolescent populations where risk factors may vary due to developmental differences. This quadratic effect of depression and anxiety may be even stronger among adolescent SMM as they may be more developmentally susceptible to social exclusion [12]. Further, there is evidence to suggest that health disparities among adolescent SMM may be driven in part by syndemics. Specifically, adolescent SMM experience serious health disparities driven by psychosocial health problems that tend to co-occur (such as depression, anxiety, and suicidal ideation) and in turn drive increased sexual risk behaviors [8].

With respect to protective factors, previous studies have found that social support, such as the provision of emotional resources from others including peers or family members, plays a role in decreasing sexual risk behaviors; conversely, less social support is associated with increased risk [13]. A recent study of adult black SMM found that men with less social support were more likely to report engaging in condomless anal intercourse (CAI) compared with those who reported more support [14]. Low familial support was also found to be associated with increased sexual risk taking among SMM aged 21–25 [15]. There is extensive evidence that parent and familial support play a pivotal role in mitigating high-risk behaviors including sexual risk but this research has focused on heterosexual adolescents and not adolescent SMM [16].

There is also evidence that mental health issues vary by race/ethnicity. Specifically, minority stress theory suggests that SMM experience mental health issues disproportionately compared to their heterosexual peers due to increased stigma, victimization, and discrimination [17]. Adolescent SMM may experience discrimination based on both their race/ethnicity and sexual orientation [3]. This discrimination can in turn increase the likelihood of mental health issues. However, recent research suggests that black adolescent SMM have lower rates of suicidal ideation and depression, which directly challenges the assumption that multiple minority statuses may additively negatively impact mental health [3, 18]. Further investigation is needed to examine if mental health issues vary by race/ethnicity among adolescent SMM.

Despite the importance of understanding HIV risk behaviors and the associated risk and protective factors among adolescent SMM, current research remains limited. In order to design effective interventions to help reduce risky sexual behaviors among adolescent SMM, we must first examine potential risk and protective factors that influence these behaviors. This analysis addresses this gap by using data from the 2015 National HIV Behavioral Surveillance among Young Men Who Have Sex with Men (NHBS-YMSM) to examine the association between mental health issues, social support, and sexual risk behaviors.

Methods

Sample

Males, 13–18 years of age, who reported ever having sex with another male, gay/bisexual identity, or same-sex attraction were interviewed for NHBS-YMSM in three cities (Chicago, New York City, and Philadelphia). Participation in NHBS-YMSM was anonymous; therefore, a waiver of documentation of informed assent/consent was requested and received for all three study sites. In addition, a waiver of parental permission for participants < 18 years of age was requested and received in New York City (approved for 13–17 years of age), Philadelphia (approved for 14–17 years of age), and Chicago (approved for 16 and 17 years of age). Sampling and recruitment methods have been described previously including details of the multiple methods used for recruitment which included respondent-driven sampling, venue-based sampling, and recruitment via Facebook [19]. Due to the nature of recruitment, we treat the data as a convenience sample. All consenting participants underwent an in-person eligibility screener and, if eligible, completed a survey with a trained interviewer. Anonymous HIV testing was offered to all participants regardless of self-reported HIV status. Participants were compensated for their participation in project activities, with the amount varying across sites. On average, participants received $25 for the behavioral survey and $25 for HIV testing. All NHBS-YMSM activities were approved by local institutional review boards (IRBs) in each respective city and by CDC.

Measures

Participants were asked about ever attempting suicide and if they had thought about committing suicide in the past 30 days (Table 1). Anxiety and depression were measured using the 4-item Patient Health Questionnaire-4 (PHQ-4) scale with a range of 0–16 [20]. A score of over three indicates probable depression and anxiety. Two continuous scales were used to measure social support. One scale measured general social support using five items capturing perceived peer and general support [21]. The second scale measured family support through four items capturing familial support [22]. Participants were asked about three sexual risk behaviors: [1] CAI with a male partner in the past 12 months, [2] ≥ 4 male oral or anal sex partners in the past 12 months, and [3] vaginal or anal sex before age 13. All sexual risk behaviors were dichotomized.

Data Analysis

Participants were included in this analysis if they had a complete, valid survey and, in order to eliminate the potential differences in mental health issues attributable to HIV status, reported being HIV-negative (n = 547). We used bivariate analyses to examine sociodemographic characteristics of participants and explore potential confounders of each variable of interest. We used Chi square and one-way ANOVA tests to examine if risk and protective factors varied by race/ethnicity. We also created a quadratic term for depression and anxiety to determine if there was a nonlinear effect between depression and anxiety and sexual risk behaviors. In order to assess the relationship between mental health issues and sexual risk behaviors, we used separate log-linked Poisson regression models, one for each sexual risk outcome, with robust standard errors to estimate adjusted prevalence ratios (aPR) and 95% confidence intervals (CI). Models were adjusted for age, race/ethnicity, and city. Race/ethnicity was not examined as an effect measure modifier in the models due to sample size constraints.

Results

A total of 547 HIV-negative individuals were included in analyses. By age, 15% were 13–15 years old (n = 76), 64% were 16–17 years old (n = 318), and 27% were 18 years old (n = 154) (Table 2). In terms of sexual identity, 64% of participants reported identifying as gay or homosexual (n = 349), 33% as bisexual (n = 178), and 3% as straight/heterosexual (n = 15). Approximately 39% of participants identified as black (n = 216), 33% as Hispanic/Latino (n = 178), and 28% as white/non-Hispanic or other (n = 153). Nearly

Table 1 Risk and protective factors examined among adolescent SMM

Variable	Risk/protective factor	# of items in scale (alpha or correlation)	Response categories	Example item/s
Mental health				
PHQ-4 scale for depression and anxiety[a]	Risk	4 (0.73)	0 = not at all to 4 = nearly every day	Over the last 2 weeks, how often have you been bothered by the following problems: feeling nervous, anxious, or on edge?
Suicidal ideation	Risk	1 (N/A)	0 = no, 1 = yes	Has there been a time in the past month when you had serious thoughts about ending your life?
Suicide attempts	Risk	1 (N/A)	0 = no, 1 = yes	Have you ever, in your whole life, tried to kill yourself or made a suicide attempt?
Social support				
General social support scale[b]	Protective	5 (0.80)	0 = strongly agree to 4 = strongly disagree	I often feel isolated and alone; There is no one I can talk to about the important decisions in my life
Family support scale[c]	Protective	4 (0.90)	0 = strongly disagree to 4 = strongly agree	My family really tries to help me; I can talk about my problems with my family

[a]Lowe et al. (2010)

[b]Lauby et al. (2012), combined items from Sherbourne and Stewart (1991) and Ensel and Woelfel (1986)

[c]Zimet et al. (1988)

Table 2 Demographic characteristics of adolescent SMM 13–18 years of age, NHBS-YMSM, 2015 (n = 547)[a]

	n	%
Age		
13–15	76	14.8
16–17	318	58.0
18	154	27.2
Sexual identity		
Straight/heterosexual	15	2.8
Bisexual	178	33.6
Gay/homosexual	349	63.6
Race/ethnicity		
Black/African American	216	39.4
Hispanic/Latino[b]	178	32.5
White/non-Hispanic/other[c]	153	27.9
Parent education[d]		
High school graduate or less	172	32.1
Technical/vocational school or some college	99	18.5
College degree and above	265	49.4
Household structure[e]		
2-Parent	239	43.6
1-Parent	252	45.9
Other family structure (grandparent, foster parents, group home etc.)	57	10.4
Household financial instability		
No	414	75.8
Yes	132	24.2

[a]Numbers may not add to total because of missing data on some items

[b]Hispanic/Latinos can be of any race

[c]Other includes adolescent SMM reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple races

[d]Highest educational attainment of either parent

[e]Household structure at time of data collection

[f]Low household SES is captured by the following item "In the past 12 months, was there a time where there wasn't enough money in your house for rent, food, or utilities such as gas, electric, or phone"

half of participants reported having a parent with educational attainment of a college degree or more (49%; n = 265). Approximately 44% of participants reported having a 2-parent household structure (n = 239), 46% a 1-parent household structure, and 10% a different household structure (n = 57) including living with a grandparent, foster parent, or group home. Almost a quarter (24%; n = 132) of participants reported household financial instability (defined as a time when there was not enough money in their house for rent, food, or utilities such as gas, electricity, or phone) in the past 12 months.

Of 547 adolescent SMM, 23% reported ever attempting suicide and 10% reported suicidal ideation in the past month (Table 3). The mean PHQ-4 score was 3.06 (standard deviation = 2.7; range: 0–12). In terms of PHQ-4 scores, 52% of participants had a score over 3 indicating likely depression and anxiety. The average reported score for general support and family support was high with respective mean scores of 18.7 (out of a possible 20) and 14.7 (out of a possible 15). Thirty-nine percent of participants reported CAI, 29% reported having ≥ 4 sex partners in the past year, and 22% reported having vaginal or anal sex before 13 years of age. While reported CAI and having ≥ 4 sex partners in the past year were similar across racial/ethnic groups, Hispanic/Latino adolescent SMM were significantly more likely to report vaginal or anal sex before 13 years of age (35%) compared to black (15%) or white/other adolescent SMM (16%).

For each 1-point increase in PHQ-4 score, the prevalence of CAI increased by 4% (adjusted prevalence ratio [aPR]: 1.04; 95% confidence interval [CI] 1.01–1.07) (Table 4). Both suicidal ideation and ever attempting suicide were associated with CAI (aPR: 1.04; CI 1.01–1.07; aPR: 1.31; CI 1.06–1.63, respectively). In separate multivariable models, ever attempting suicide was associated with having ≥ 4 sex partners (aPR: 1.71, CI 1.31–2.21). For each 1-point increase on the family support scale, the prevalence of having ≥ 4 sex partners decreased by 4% (aPR: 0.96, CI 0.93–0.98). The quadratic depression and anxiety term was not associated with sexual risk behaviors. There were no associations between any risk factors and having vaginal or anal sex before 13 years of age. Social support was not associated with any of the sexual risk behaviors.

Discussion

Similar to previous research [5, 23–25], we found that anxiety, depression, suicidal ideation, and suicide attempts were common among adolescent SMM, and, in our sample, these mental health issues were associated with HIV-related sexual risk behaviors. Both suicidal ideation and suicide attempts were similar across reported race/ethnicity groups, which is consistent with recent research comparing adolescent SMM to their heterosexual counterparts [18, 19]. The only significant difference between race/ethnic groups was that a larger proportion of Hispanic/Latino participants reported first sex before age 13 compared to white/other and black participants. This finding differs from data among heterosexual adolescents that suggest sexual debut is typically earliest among black males [26].

We found evidence that mental health issues were associated with sexual risk behaviors among adolescent SMM. Our finding that depression and anxiety were associated with CAI is consistent with findings from studies focused on adults and young adults aged 23–29 [27, 28]. Ever attempting suicide was associated with both CAI and having ≥ 4 sex partners. Due to the cross-sectional nature of this study, we

Table 3 Mental health, social support, and sexual risk behaviors among adolescent SMM 13-18 years of age by race/ethnicity, NHBS-YMSM, 2015 (n = 547)[a]

	Total		Black/African American		Hispanic/Latino[b]		White/non-Hispanic/Other[c]		*p*-value[d]
	n = 547		n = 216		n = 178		n = 153		
	n	%	n	%	n	%	n	%	
Ever attempted suicide[e]									
No	425	77.6	165	76.4	136	76.4	124	81.1	0.21
Yes	123	22.5	51	23.6	42	23.6	29	18.9	
Suicidal ideation, past 30 days[e]									
No	492	89.9	195	90.3	160	89.9	136	89.5	0.52
Yes	55	10.1	21	9.7	18	10.1	16	10.5	
PHQ-4 (depression and anxiety)[e]									
Mean score	3.1	2.7 (SD)	2.7	2.6 (SD)	3.1	2.7 (SD)	3.4	2.8 (SD)	0.07
General social support[e]									
Mean score	18.71	4.0(SD)	18.63	4.0 (SD)	18.41	4.3 (SD)	19.3	3.5(SD)	0.11
Family Support[e]									
Mean score	14.73	3.9 (SD)	14.81	3.9(SD)	14.66	4.1 (SD)	14.77	3.9 (SD)	0.92
Condomless anal intercourse, past 12 months									
No	333	60.8	126	58.3	107	60.1	100	65.4	0.56
Yes	215	39.2	90	41.7	71	39.9	53	34.6	
≥4 sex partners, past 12 months									
No	389	70.9	155	71.8	125	70.2	109	71.2	0.64
Yes	159	29.0	61	28.2	53	29.8	44	28.8	
First sex before age 13									
No	429	78.4	183	85.1	116	65.2	129	84.3	<0.001
Yes	118	21.6	32	14.9	62	34.8	24	15.7	

Acronym: *SD* standard deviation

[a]Numbers may not add to total because of missing data on some items

[b]Hispanic/Latinos can be of any race

[c]Other includes adolescent SMM reporting American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, other race, or multiple races

[d]Chi square used for dichotomous outcome variables. One-way ANOVA used to examine continuous risk and protective factors

[e]See Table 1 for definition

[f]Past 12 months

could not determine the timing of reported suicide attempts and sexual risk behaviors. Previous studies focused on suicide attempts typically conceptualize suicide attempts as a consequence of adverse life events, which may include sexual risk behaviors [29]. However, improving mental health outcomes among adolescents may in turn reduce sexual risk behaviors.

The null finding for the quadratic association between depression and anxiety and sexual risk behaviors appears counter to previous research suggesting an inverted u-shape effect where risk was highest at moderate levels of depression while decreasing at severe levels of depression [10, 30]. This difference may be due to variance in how CAI and other sexual risk behaviors are defined across studies. There may also be differences due to the samples examined, as previous research focused on adult SMM [9]. Where adults may be more able to socially isolate themselves, adolescents often cannot opt out of social situations such as school. Other research suggests as depression increases so do reports of CAI, which was similar to what we found [9].

In terms of social support our findings were mixed. We did not find a protective association between general social support and sexual risk behaviors. Previous research pointing to the positive impact of social support focused on all adolescent sexual minorities, not just males; therefore, the results may be due to the different population focus [31]. Family support was protective in terms of reducing the prevalence of reporting ≥ 4 sexual partners in the previous 12 months. This may indicate that family support plays a more significant role than general support among young

Table 4 Association between risk/protective factors and sexual risk behaviors among adolescent SMM 13–18 years of age, NHBS-YMSM, 2015 (n = 547)

Variable	aPR[ab]	95% CI	*p*-value
Condomless anal intercourse, past 12 months			
PHQ-4 (depression and anxiety)[c]	**1.04**	**1.01–1.07**	**0.03**
Suicidal ideation past 30 days[cd]	**1.04**	**1.01–1.07**	**0.03**
Ever attempted suicide[cd]	**1.31**	**1.06–1.63**	**0.01**
General social support[c]	0.99	0.96–1.02	0.42
Family support[c]	0.98	0.95–1.00	0.07
Variable	aPR[ab]	95% CI	*p*-value
≥ 4sexual partners, past 12 months			
PHQ-4 (depression and anxiety)[c]	1.03	0.98–1.08	0.22
Suicidal ideation past 30 days[cd]	1.09	0-70–1.67	0.71
Ever attempted suicide[cd]	**1.71**	**1.31–2.21**	**<.001**
General social support[c]	0.99	0.96–1.03	0.77
Family support[c]	**0.96**	**0.93–0.98**	**0.01**
Variable	aPR[ab]	95% CI	*p*-value
First vaginal or anal sex before 13 years of age			
PHQ4 (depression and anxiety)[c]	1.06	0.98–1.11	0.06
Suicidal ideation past 30 days[cd]	1.51	0.98–2.32	0.06
Ever attempted suicide[cd]	1.22	0.90–1.65	0.19
General social support[c]	0.97	0.94–1.01	0.12
Family support[c]	0.96	0.93–1.00	0.05

Bold values are statistically significant ($p < 0.05$)

[a]All models adjusted for age, race/ethnicity, and city

[b]Reference group = no

[c]See Table 1 for definition

[d]Adjusted for PHQ-4

adolescent SMM which maps on to previous research pointing to the key role families and parents play in mitigating sexual risk behaviors [16]. Additional research is needed to better understand the potential positive impact social support and family support and other potential protective factors such as parental monitoring and communication can have in reducing risk behaviors among adolescent SMM [32].

Limitations

Although our analysis provides evidence of an association between mental health issues and sexual risk behaviors, it is not without limitations. First, this was a convenience sample of adolescent SMM. Therefore, participants may not be representative of all adolescent SMM 13–18 years of age in the participating cities or in other settings in the United States. Second, data were self-reported and might be subject to both social desirability bias and recall error. Third, due to the cross-sectional nature of the data, directionality of the associations cannot be ascertained. Fourth, the selected measurement of key variables likely influenced the results. Participants were asked about suicidal ideation in the past thirty days rather than if they had ever thought about committing suicide; this may have limited the sensitivity of this item in adequately capturing suicidal ideation. In the current study, only dichotomous outcome measures were available for analysis, which may explain why the quadratic depression and anxiety term was not significant. Previous research suggests that when CAI is treated as a count variable (in terms of number of times a person reports having CAI) versus dichotomous, it is associated with depression and anxiety among adult SMM [9].

There may be other risk factors that are commonly linked to depression, suicidal ideation, and suicide attempts that may be associated with sexual risk-taking that we could not examine in this analysis. For example, emotional dysregulation and reduced self-efficacy is associated with sexual risk behaviors among adult SMM [27]. We did not examine either emotional dysregulation or self-efficacy in the current study. Future research should incorporate these and other potential risk or protective factors that may also be influencing sexual risk behaviors among

adolescent SMM. The majority of research to date has focused on individual and interpersonal factors but future research should try to include risk and protective factors from other levels of socio-ecological framework including community and policy level factors [33]. Exploring factors from across the socio-ecological framework that reflect the syndemic nature of these factors can help to inform more comprehensive intervention approaches which may include designing approaches for the school environment.

Conclusions and Recommendations

Our findings highlight the potentially important relationship between mental health and sexual risk behaviors among adolescent SMM. The current study contributes to the growing body of research on adolescent SMM and sexual risk behaviors [33]. Findings suggest that for adolescent SMM, anxiety, depression, and suicide attempts are significantly associated with certain sexual risk behaviors that may place them at increased risk of HIV. Additional research is needed to explore other potential risk and protective factors associated with sexual risk behaviors among adolescent SMM.

Currently, few interventions address HIV sexual risk behaviors among adolescent SMM and those that do exist do not necessarily target mental health [34]. Including mental health in comprehensive HIV prevention for adolescent SMM could reduce HIV risk in this population. Appropriate venues for interventions include healthcare settings, schools, or digital applications [35]. However, interventions via healthcare providers alone may be insufficient and there are significant challenges to reaching adolescent SMM in educational environments [19]. Specifically, the majority of current sexual education programs in the United States fail to incorporate sexual minority experiences [36] and school may often be unwelcoming and tense for adolescent SMM [37]. Improving school climate and connectedness for sexual minority students is important as a more positive environment has been associated with a reduction in adverse mental health outcomes, including suicidal ideation and depression [38, 39]. Adolescent SMM are experiencing a growing HIV epidemic alongside high prevalence of anxiety, depression, suicidal ideation, and suicide attempts. Innovative and evidence-based intervention programming that addresses mental health risk factors and sexual risk behaviors, and fosters general and family support may help prevent HIV and among this vulnerable population.

Disclaimer The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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