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Effects of parental monitoring and knowledge on substance use and HIV risk behaviors among young men who have sex with men: Results from three studies

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Abstract

Young men who have sex with men (YMSM) are disproportionately impacted by HIV/AIDS and have elevated rates of substance use. Parenting practices, such as knowledge of child whereabouts and monitoring of behavioral rules, protect against these outcomes among heterosexual youth. This article examined the relationship between these parenting practices and substance use and HIV risk behaviors among YMSM. Data are reported from three similar studies of YMSM: ChiGuys (ages 14-18), Crew 450 (ages 16-22), and RADAR (ages 16-29). The ChiGuys and RADAR studies report cross-sectional analyses, whereas Crew 450 reports latent growth curve analyses. In ChiGuys and Crew 450, participants reported significantly higher scores for parental knowledge of general activities than parental knowledge of gay-specific activities. Parental knowledge of general activities was significantly associated with less binge drinking in both samples and with condomless sex in the ChiGuys sample. Parental monitoring was significantly associated with less marijuana use and condomless sex in younger RADAR participants (16-18 years) and with less drug use in older participants (>18 years). Findings support the need for further research on the influences of parents on YMSM health risk behaviors and the value of exploring family- and parent-interventions to address YMSM health.

Keywords

gay; bisexual; adolescent; alcohol; marijuana

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Young men who have sex with men (YMSM) are at disproportionate risk for HIV/AIDS and substance use[1,2]. Among 13-24 year olds in the U.S., YMSM accounted for over 80% of diagnoses of HIV infection in 2014[3] and showed a 10% increase in the rate of diagnoses from 2010-2014[4]. Annual incidence of 4.11% has been reported among YMSM ages 16-22 years[5] and a simulation model of the epidemic predicted ongoing increases in HIV incidence over the next decade[6]. YMSM are more likely to use alcohol and drugs and are more likely to initiate use at earlier ages than their heterosexual peers[2,7,8]. In a review of HIV among YMSM, drug use overall and drug use prior to sex were two of the strongest predictors of condomless sex[9]. Drug use, particularly "club drugs" (i.e., ecstasy, methamphetamine, etc.), has shown large effects on increased condomless sex[10-13]. Marijuana has increasingly gained attention for its positive association with condomless sex in both adolescent[14,15] and adult samples of MSM[16-18]. Associations with alcohol consumption have been conflicting, although binge drinking has produced consistent positive associations with condomless sex[9,19].

Prior research has studied factors that increase risk for HIV and substance use among YMSM, but has paid limited attention to factors that are protective or that promote resiliency[20-23]. Theories that address the contexts and systems of influences in the lives of young people, such as Ecological Systems Theory[24], highlight the importance of the family-system in adolescent health and wellbeing. While there has been substantial research on the influence of parent-child relationships and interactions on heterosexual adolescent sexual health and substance use, this has received very little research attention among YMSM[9,20,25].

Two recent meta-analyses have been published on the influence of parenting practices on adolescent sexual health. One meta-analysis of 52 studies of over 25,000 adolescents found a small overall association (r = .10) between parent-adolescent sexual communication and adolescent safer sex behavior[26]. Moderation analyses revealed larger effects for girls (r = .12) than boys (r = .04), which raises questions about the effectiveness of parent-child communication about sex for promoting boys' sexual health. The second meta-analysis included 30 studies of over 40,000 adolescents and found that higher parental knowledge about the adolescent's activities and whereabouts was associated with increased condom use, but parental monitoring, or tracking and enforcing rules for adolescent behaviors (e.g., homework, using drugs or alcohol), was not[27]. There was significant heterogeneity in effect sizes across studies, suggesting further research is needed that can help build a literature where effect moderators can be identified. Neither of these meta-analyses reported results specifically for YMSM, and child sexual orientation was not reported as a coding variable.

A number of studies have examined if interventions to change parenting practices can reduce adolescent sexual risk taking. A systematic review of this literature identified five randomized control trials (RCTs) of parent-based interventions and nine family-based RCTs[28]. Parent-based interventions showed preliminary evidence of effectiveness, whereas few of the family-based interventions were effective. Notably, the CDC's compendium of evidence-based HIV risk reduction interventions includes two family-based interventions designed to reduce risk with Hispanic[29,30] and Black adolescents[31]. Both of these programs also reported effects on reducing adolescent substance use[32,33].

Considerable research over the preceding three decades has shown an association between parenting practices and children's initiation and use of substances[34,35]. Furthermore, numerous RCTs have been conducted on parent and family interventions and a review found all of these programs focused on setting strict rules against underage substance use, improving parent–child communication, and monitoring children's' activities[36]. A meta-analysis of these programs that included 116 manuscripts reported a small-to-moderate overall effect[37].

Bouris and colleagues[21] reviewed the literature on parental influences on sexual risk and substance use among lesbian, gay, and bisexual youth. None of the reviewed studies focused on parental monitoring, despite it being a primary focus in research with heterosexual youth. Instead, the parental influences studied including parent-child emotional connectedness, parental disapproval of sexual risk behaviors, and parents' knowledge and reaction to their child's sexual orientation. Few significant associations with sexual risk taking were found. In the first study to examine the effects of parental monitoring and knowledge on sexual risk taking among YMSM, Thoma and Huebner[38] found that among YMSM that were out to their parents, parental monitoring had no effect on condomless anal sex (CAS). However, for those YMSM who were not out to parents, monitoring *increased* engagement in CAS. The authors suggested that parental monitoring may increase risk because, in the context of YMSM trying to maintain secrecy, it might be more difficult to plan for sex and thereby obtain and use condoms consistently[38]. Qualitative research with sexual and gender minority adolescents has found that many parents enforce a code of silence about sex, which may hamper their ability to monitor their children's risk behaviors[39]. In terms of substance use, Bouris and colleagues[21] identified five articles in their review. These studies suggest parent rejection is a risk factor for substance use and parental support may show a protective effect.

Across these studies several patterns can be distilled. First, there has been very little research on parental influences on YMSM health, and most existing studies have focused on emotional aspects of the relationship such as rejection/acceptance or support, rather than parenting practices like monitoring. Very few of these studies have included YMSM under age 18, which is an important drawback given the developmental salience of parents among adolescents versus emerging adults[40]. Second, the pattern of results suggests that parenting practices that have shown relatively consistent relationships in the general adolescent literature (i.e., knowledge) may operate differently among YMSM[38,41]. Third, the failure to replicate effects found in general samples of youth and inconsistencies in findings across the few studies of YMSM suggest that approaches that can enhance scientific rigor and reproducibility, such as multiple replication studies in similar samples, should be utilized when possible. Fourth, there has been a near absence of longitudinal research in this area.

The purpose of this article is to examine the relationship between two central aspects of parenting practice, knowledge of child whereabouts and monitoring of behavioral rules, and YMSM substance use and HIV risk behaviors. In the interest of examining the robustness of results, this article reports data from three complementary studies of YMSM. Two of the studies (ChiGuys and Crew 450) use measures of perceived parental knowledge of participant whereabouts, whereas the other study (RADAR) uses a measure of parental monitoring focused on enforcement of rules. Our measure of parental knowledge expands on

prior research by examining both knowledge of general activities (e.g., checking in with parents before going out) and knowledge of gay-specific activities (e.g., telling parents about going to a gay event). This distinction is important because prior studies have suggested parenting practices for YMSM may operate differently than for heterosexual adolescents precisely because parents are less aware and understanding of gay venues and social contexts. All three studies include YMSM under the age of 18, but the differing ages of the samples allowed for examination of robustness of effects across the developmental spectrum from adolescence into emerging adulthood. Two of these studies report cross-sectional analyses and one reports longitudinal analyses that allowed for examination of prospective effects of parental knowledge over developmental time.

Methods

Participants and Procedures

Data for the current study were taken from three samples of YMSM in Chicago. First, Crew 450 was a longitudinal study designed to analyze the prevalence, course, and predictors of a syndemic of psychosocial health issues linked to HIV among YMSM (N=450)[5,42]. Participants were aged 16-20 at baseline and were recruited via targeted in-person outreach, geosocial network applications, and peer-incentivized snowball sampling. Measures of parental knowledge were only administered if participants reported living with their parent or guardian, and as such the 52% of participants who met this criterion were included in analyses (analytic N = 233). Data were collected using a computer assisted self-interview (CASI).

Second, the ChiGuys study sample was a 2015 pilot of the CDC's National HIV Behavioral Surveillance study[43] to examine the feasibility of collecting data from MSM aged 14-18 years[44]. Participants (N=231) were recruited through online advertisements (37%) and respondent driven sampling (63%). After screening eligible, participants completed an interviewer administered survey and HIV test. Only participants in the ChiGuys sample that answered the parental knowledge items were included in the present study (N=225).

The third study included was RADAR, an ongoing longitudinal cohort study of YMSM that aims to understand multilevel influences on HIV risk and substance use. This cohort is being formed (current N=981) by merging three existing studies of YMSM, two of which were the Crew 450 and ChiGuys samples described above. The third cohort consisted of YMSM from Project Q2[45], who were aged 16-20 at baseline and were recruited using respondent driven sampling. In addition to inviting participants in Project Q2, Crew 450, and ChiGuys to join the RADAR cohort, the cohort sample is being expanded by venue- and peer-based recruitment of 16-20 year old YMSM and referral of serious romantic partners by existing cohort members. Data were collected using a computer assisted self-interview (CASI). In this manuscript we report analyses of the baseline RADAR study data where participants range in age from 16-29. There were two participants who did not answer the parental monitoring items and were not included in analyses.

All three studies shared the following eligibility criteria: 1) male sex assigned at birth; 2) previous sexual encounter with a male, identification as gay or bisexual, or same-sex

attracted; and 3) English speaking. All studies were approved by the Institutional Review Board with waivers of parental permission[46]. In these analyses, we report cross-sectional analyses from the ChiGuys and RADAR studies. In Crew 450, we utilize five waves of longitudinal data, including baseline and four follow-up waves, each separated by six months (1-year retention 83.7%; 2-year retention 75.5%).

Measures

Outness and Parental Rejection—Participants in all three studies were asked if they were out about their sexual orientation to their mother, their father, or both. In the ChiGuys and RADAR samples, participants who reported being out to a parent were then asked about each parent's response on a one to four scale ranging from "Very Positive" to "Very Negative." Parental rejection was scored as the mean of each parents' reaction, or a single parent's reaction when only one reaction was described.

Parental Knowledge—Parental knowledge was measured in both the ChiGuys and Crew 450 sample using the five-item parental knowledge subscale of the Parenting Style Questionnaire (PSQ)[47,48]. The parental knowledge subscale asked about parental knowledge of adolescent behavior such as "How often do your parents/caregivers check in with you to see what you are up to?" Questions on the PSQ were measured on a five-point scale with response options "Never or almost never," "Occasionally," "About half the time," "Often," and "Always or almost always" coded as zero to four. Alphas were acceptable in both ChiGuys (α = .81) and Crew 450 (α = .83). In order to measure parental knowledge as it related to knowledge of adolescent's attendance of gay events and with gay friends, we modified questions on the PSQ to create a separate three-item scale that measured gay-specific parental knowledge. The gay-specific scale also had adequate reliability in both samples (ChiGuys: α = .78; Crew 450: α = .90). Mean composites were created for both parental knowledge and gay-specific parental knowledge.

Parental Monitoring—In the RADAR sample, parental monitoring was measured with the eight-item Poor Family Management (PFM) subscale from the Family Risk and Protective Factors section of the Communities that Care study[49-51]. The PFM includes questions about parent's monitoring behaviors such as "If I skip school, I will be caught by my parents/caregivers." Response options were on a four-point scale from "Strongly disagree" to "Strongly agree" coded as one to four. For participants over the age of 18, the questions on the PFM were reworded in the past tense (i.e., "The rules in my family are clear" became "The rules in my family were clear"). The PFM scale had adequate reliability for the sample as a whole (α = .83) as well as for participants 18 years and under (α = .83) and 19 and over (α = .83). A mean composite was created from the eight items.

Binge Drinking—In the ChiGuys sample, participants were asked to report the number of times in the previous 30 days they had binge drank, defined as five or more drinks on a single occasion. Participants who reported that they had never had a drink were coded as zero. In the Crew 450 sample, participants were asked "During the past six months, how often did you have five or more drinks containing alcohol within a two-hour period?" Response options ranged from zero to nine and included "zero days," "one or two days in

the past six months," "three to five days in the past six months," "One day a month," "two to three days a month," "One day a week," "Two days a week," "three to four days a week," "five to six days a week," and "Everyday." Participants in the RADAR sample were asked "How often do you have six or more drinks on one occasion?" in the previous six months. Response options were coded as zero to four and included "Never," "Less than monthly," "Monthly," "Weekly," and "Daily or almost daily."

Marijuana Use—Participants in the ChiGuys sample were asked to report how often they had used marijuana in the past 12 months on an eight-point scale (coded as zero to seven) with response options "Never," "Less than once a month," "Once a month," "More than once a month," "Once a week," "More than once a week," "Once a day," and "More than once a day." Participants who reported having never used marijuana were coded as zero. In the Crew 450 sample, participants were asked "During the past six months, how many times did you use marijuana?" Response options were coded zero to six and included "zero times," "one to two times in past six months," "Once a month or less (three to six times in past six months)," "two or three times a month," "one or two times a week," "three to five times a week," and "Everyday or almost everyday." In the RADAR sample, participants were asked "On how many occasions have you used marijuana (also called weed or pot) in the past 30 days?" with response options "0," "1-2," "3-5," "6-9," "10-19," "20-39," and "40 or more" (coded zero to seven).

Drug Use—To assess drug use in the ChiGuys sample, a dichotomous variable was created such that participants who reported using cocaine, crack, methamphetamine, non-prescription downers or pain killers, ecstasy, heroin, or poppers in the previous 12 months were coded as one, and participants who reported no drug use in that period were coded as zero. The dichotomous variable was formed in this sample because of the low level of endorsement of individual drugs. Drug use in the Crew 450 sample was measured by assigning participants the value of the drug (cocaine, heroin, methamphetamines, opiates, non-prescription depressives, non-prescription stimulants, psychedelics, ecstasy, GHB, ketamine, inhalants, and poppers) that they endorsed using the most frequently in the previous six months. Response options were coded zero to six and included "zero times," "one to two times in past six months," "Once a month or less," "two or three times a month," "one or two times a week," "three to five times a week," and "Everyday or almost everyday." In the RADAR sample, a quantity variable was created based on the number of unique drugs (cocaine, heroin, methamphetamines, GHB, ketamine, poppers, inhalants, hallucinogens, and ecstasy) participants endorsed using in the previous six months (range: zero to nine).

Condomless Anal Sex—In all three samples, participants were administered the HIV Risk Assessment of Sexual Partnerships (H-RASP)[52]. The H-RASP is an assessment of sexual behavior and associated situational and contextual factors that was designed for YMSM to report partner-specific data. Participants were asked to report on the number of unprotected anal sex acts with their last three partners. A sum score was created across partners for each participant. Participants were also asked to report their total number of unprotected anal sex partners. In the ChiGuys sample, these questions were specific to the

previous 12 months. In the Crew 450 and RADAR samples, the questions were specific to the previous six months.

Statistical Analyses

Concurrent associations between parental knowledge and substance use and sexual risk taking outcomes were analyzed in the ChiGuys sample using negative binomial and logistic regression analyses in SPSS 23. Negative binomial models were used in order to account for the non-normal distribution of count data. Zero-inflated negative binomial models were fit for CAS acts and the zero-inflation component was not significant and including it did not change the pattern of count effects. For the sake of parsimony and broadest understanding of analyses and results, the negative binomial regression model are reported. The effects of parental knowledge on change over time in substance use and sexual risk taking outcomes in the Crew 450 sample was tested by regressing baseline parental knowledge onto latent growth curves created for each risk behavior from the five waves of data. This analysis was accomplished in MPlus v. 7.31 using time scores to create individually varying assessment schedules for each participant and account for differences in age at the start of Crew 450. Time scores were based on participant age at each wave and were centered at age 16 (youngest age at enrollment). In MPlus, maximum likelihood allowed for use of all available data in consideration of some degree of missingness. The last set of analyses were conducted with the RADAR sample and were used to test for associations between parental monitoring and substance use and sexual risk outcomes. Negative binomial and linear regression in SPSS were used. The analyses were run for the full sample and then run separately for participants 18 years and under (N = 171) and participants 19 and over (N = 510) in order to test whether the effects of parental monitoring were more apparent for participants who were minors.

In all analyses, age, race/ethnicity, and bisexual sexual orientation status were included as covariates. Race/ethnicity was dummy coded as separate variables representing identification as Black/African American, Hispanic/Latino, and a combined variable representing all other racial groups, with White as the reference group. Bisexual status was coded as one if participants identified as bisexual and zero if participants identified as any other sexual orientation.

Results

Demographics and Descriptive Statistics

Demographics for the ChiGuys, Crew 450, and RADAR samples are reported in Table 1. Mean ages of the samples reflect the age inclusion criteria for each study, with ChiGuys the youngest (M = 17.12 years), then Crew 450 (M = 18.52), then RADAR (M = 21.47). Each of the samples were comprised of a majority of race/ethnic minority and gay-identified participants. As explained in the measures section, only Crew 450 participants who lived with a parent/guardian were asked about parental knowledge and therefore 100% of Crew 450 participants in the analytic sample lived with a parent/guardian. Reflecting the young age of the ChiGuys sample (14-18 years), the majority (92.4%) lived with a parent/guardian, whereas the proportion was much lower (34.8%) in the older (16-29 years) RADAR sample.

In a paired-samples t-test, parental knowledge of general activities was significantly higher compared to the parental knowledge of gay-specific activities in both the ChiGuys (Mean Difference = .76, t = 8.21, p < .001) and Crew 450 (Mean Difference = .56, t = 6.37, p < .001) samples, indicating YMSM were significantly more likely to talk to parents about general whereabouts and activities than those that were related to gay venues and friends. Scale mean scores indicate that on average participants reported telling parents about general activities slightly more than half the time, and gay-specific events between "occasionally" and "about half the time." In the ChiGuys sample, age was significantly negatively associated with parental knowledge (Std. Beta = −.20, p < .01) and bisexual participants reported significantly higher parental knowledge compared to participants who identified as gay or "other" (Std. Beta = .17, p < .05). There were no significant race/ethnicity differences. Similar to the ChiGuys sample, in the Crew 450 sample age at baseline was significantly negatively associated with parental knowledge (Std. Beta = −.24, p <.001). There were no differences based on race/ethnicity or sexual orientation in the Crew 450 sample. In an independent samples t-test, there was no significant difference between RADAR participants 18 years and under and participants 19 and over on the parental monitoring scale (Mean Difference = −.09, p = .15). There were also no significant differences based on race/ethnicity or sexual orientation.

Descriptive statistics for outcome variables are shown in Table 2 for ChiGuys and Table 4 for RADAR. Descriptive statistics for the Crew 450 sample are shown in Table 3 in the form of intercepts for baseline values of each outcome in the latent growth curve model.

Outness to Parents, Parental Acceptance, and Parenting Practices

In terms of outness to parents, in the ChiGuys sample 75.4% were out to at least one parent, 74.2% in Crew 450 at baseline, and 82.5% in RADAR. In the ChiGuys sample, being out to parents was unrelated to level of parental knowledge of general activities (Mean Difference = −.03, p = .86). However, ChiGuys participants who were out to at least one parent reported significantly higher levels of parental knowledge of gay-specific activities (Mean Difference = 1.03, p < .001). Parental rejection scores were significantly negatively correlated with general knowledge (r = −.26, p < .01) and gay-specific knowledge (r = −.34, p < .001). In the Crew 450 sample, being out to the mother had a significant positive association with higher levels of general (Mean Difference = .36, p < .05) and gay-specific knowledge (Mean Difference = 1.36, p < .001). Outness to fathers was not associated with general knowledge in Crew 450 (Mean Difference = −17, p = .26), but was significantly and positively associated with gay-specific knowledge (Mean Difference = .73, p < .001). In the RADAR sample there were no associations between outness to parents and parental monitoring (Mean Difference = −.03, p = .70), and parental rejection showed only a small but significant negative association with monitoring (r = −.09, p < .05). No significant differences were found for age.

Effects of Parenting Practices on CAS and Substance Use

Knowledge of general and gay-specific activities had significant and positive correlations in the ChiGuys (r = .35, p < .001) and Crew 450 (r = .44, p < .001) samples. Initially, separate models were run with parental knowledge of gay-specific activities as the primary predictor,

but these models were not significant for the ChiGuys or Crew 450 samples on any of the outcomes, so only results for parental knowledge of general activities are presented.

ChiGuys—The effects of parental knowledge on substance use and sexual risk taking behaviors in the ChiGuys sample are shown in Table 2. Controlling for age, race/ethnicity, and bisexual identity, higher parental knowledge was significantly associated with lower rates of binge drinking in the last 30 days and fewer CAS acts in the previous three months. There were no significant associations between parental knowledge and marijuana use, other drug use, and number of CAS partners.

Crew 450—Results for parental knowledge predicting rates of change in substance use and sexual risk taking behaviors from the multivariate latent growth curve model are shown in Table 3. In terms of demographic effects, participants who identified as Black, Hispanic/Latino, or were in the “other” race category all had significantly lower rates of growth in marijuana use and number of other drugs used compared to White participants. Participants who identified as Black had significantly lower growth in number of CAS partners compared to White participants. Participants in the “other” race category also had significantly higher number of baseline CAS acts, lower growth in CAS acts, higher baseline number of CAS partners, and lower growth in number of CAS partners compared to White participants.

Higher parental knowledge was significantly associated with lower baseline binge drinking. Overall the slope for binge drinking was not significantly different than zero, but parental knowledge was significantly associated with the slope of binge drinking over time. A plot of the effect of parental knowledge (see Figure 1) indicated that those higher in parental knowledge at baseline started at lower levels of binge drinking but over time showed increases to become more similar in level of binge drinking as those lower in parental knowledge at baseline. Parental knowledge was not significantly associated with baseline levels or developmental changes in marijuana use, other drugs, number of CAS acts, or number of CAS partners.

RADAR—Results for parental monitoring on substance use and sexual risk behaviors are presented in Table 4. Black participants had significantly lower levels of binge drinking and used significantly fewer hard drugs compared to White participants, but they reported significantly higher levels of marijuana use. Black participants 18 years and under reported a significantly higher number of condomless sex partners compared to White participants. Hispanic/Latino participants reported significantly fewer condomless anal sex acts compared to White participants. Hispanic/Latino participants 19 years and over reported significantly lower marijuana use compared to White participants. Bisexual participants reported significantly higher marijuana use and more hard drugs used compared to participants who reported a different sexual orientation.

Higher parental monitoring was significantly associated with less marijuana use for the whole RADAR sample, for participants 18 years and under, and for participants 19 and over. Higher parental monitoring was significantly associated with a lower number of other drugs used in the full sample and the 19 years and over group. Higher parental monitoring was

also significantly associated with lower numbers of CAS acts and fewer CAS partners for the 18 years and under group. There were no significant associations between parental monitoring and binge drinking.

Discussion

The purpose of this study was to examine if two specific dimensions of parenting practice—monitoring of adherence to rules and knowledge of child whereabouts and activities— were predictors of engagement in HIV risk behaviors and substance use among YMSM. In terms of engagement in HIV risk taking behaviors, parental knowledge was significantly associated with CAS in the youngest sample (ChiGuys), but not baseline levels (estimated at age 16) or longitudinal changes in Crew 450. Parental monitoring was significantly associated with CAS in the RADAR sample, but only for participants who were age 18 years and under. In the RADAR sample the effects were significant for both number of CAS acts and number of CAS partners, whereas in the ChiGuys sample effects were only significant for number of CAS acts. As two-thirds of our samples found significant associations between parenting practices and CAS among those 18 and under we suggest this is a promising area for future HIV prevention research with YMSM.

In terms of substance use, parental knowledge was related to rates of binge drinking in both of the samples where it was measured (ChiGuys and Crew 450), but it was not related to use of other substances. The ChiGuys sample was the youngest sample and the longitudinal analysis of the Crew 450 data showed a significant effect on baseline binge drinking as estimated at age 16 years. As such, it appears that parental knowledge has significant protective effects against binge drinking in middle-to-late adolescents. The significant effect on slope in the Crew 450 sample also suggests effects may be limited over time because YMSM with lower levels of parental knowledge had significantly higher rates of binge drinking at age 16, but over time showed similar rates to youth with higher parental knowledge. Parental monitoring was not related to binge drinking in the RADAR sample, but it was associated with rates of marijuana use and use of hard drugs in the older segment of the sample (19 years and over). Taken together, findings suggest general parental knowledge is related to binge drinking, but not other drugs, whereas parental monitoring is related to marijuana use and use of other drug in older youth. It’s important to note that youth who were not living with their parents (primarily older participants) were asked to recall past parental monitoring when they did live at home. This pattern may reflect higher access and use of illicit drugs at older ages (19 years and older), which is also a time when parents tend to reduce their ongoing tracking of their child’s whereabouts and begin to rely on the child’s internalization of rules about drug use. Alcohol is much more available at younger ages than illicit drugs, and binge drinking is more detectable by parents due to obvious intoxication and signals of alcohol consumption, such as smell. As such, parental knowledge may have greater effects at younger ages when YMSM are living at home and alcohol consumption is illegal, whereas for drugs that become more available later when children are less likely to live at home it is the internalization of parental rules that may be more important.

Across both HIV risk behaviors and substance use a general pattern across samples was that we observed larger effects at younger ages. This pattern makes sense in light of the significant negative association between parental knowledge and age we found in the ChiGuys and Crew 450 samples. This age difference likely reflect the developmental process of parents engaging in less solicitation of information about their children's whereabouts as they grow up and expect greater independence[53-55]. As these developmental changes occur parental knowledge of activities naturally becomes a less effective strategy for prevention of sexual risk taking and substance use.

One innovative aspect of our study was the inclusion of a measure of knowledge that focused specifically on telling parents about attending gay-specific activities. The mean score on this scale suggested that it was less common for the YMSM participants to tell their parents about attending gay events and about their gay friends. Consistent across samples, scores on this gay-specific measure were significantly lower than the more general knowledge measure. The gay-specific and general parental knowledge measures were moderately correlated, which suggests that youth who tell their parents more about their general whereabouts also tend to tell them more about gay-specific activities. However, that they were only moderately correlated indicates that these are separate dimensions and that general parental knowledge measures only provide a modest amount of information about how much young people are telling them about gay-specific aspects of their lives.

Consistent across samples, being out to parents significantly increased scores on gay-specific parental knowledge, however if YMSM perceived their parents as being rejecting of their sexual orientation then scores were significantly lower. These results are consistent with the only other study to examine these associations, which found that in a sample of 14-19 year old MSM (mean age = 17.37) that participants who were out to their parents reported they were significantly more likely to keep their parents informed of their general whereabouts and activities[38]. As such these results suggest that reacting in a rejecting manner to a child's sexual orientation is a barrier to effectively monitoring to protect them from engaging in behaviors that could put them at risk. As such, programs that can increase parental acceptance may have additional benefits on effective parenting practices.

Across all outcomes, our novel measure of gay-specific parental knowledge showed no significant relationships with HIV risk or substance use outcomes. This lack of relationship may reflect the fact that levels of gay-specific parental knowledge were low, and significantly lower among youth who were not out or whose parents were more rejecting. If YMSM are not telling their parents about their whereabouts when attending gay venues or activities it would hinder their parents' ability to engage in effective supervision of those activities. Research in general adolescent samples has found that adolescents who perceive their parents as disapproving of activities they engage in are more likely to lie to their parents[56]. Consistent with this interpretation, existing evidence suggests YMSM may not tell their parents about involvement in gay-specific venues or events, particularly when they are not out to their parents, their parents are rejecting, or the family atmosphere discourages discussions of same-sex relationships[38,39,57]. For example, in interviews with young adult MSM about their coming out experiences with their fathers, Jadwin-Cakmak and colleagues[58] described reactions that included explicit prohibitions on discussing same-sex

activities (i.e., denial) or that expressed hurt feelings. Such reactions would likely silence YMSM from telling their parents about their activities and relationships in the gay community. In interviews with parents of gay and lesbian children, Saltzburg[59] described how emotional anguish associated with grappling with their child's sexual orientation led some parents to disengage from parenting functions.

Our results have a number of implications for future research and prevention efforts with YMSM. First, low endorsement by YMSM of perceived parental monitoring and knowledge, coupled with some significant associations with substance use and HIV risk behavior, suggest the value of parent- and family-interventions that can help improve parenting practices that can reduce risks of substance use and HIV. Several such programs have been found effective with presumably heterosexual samples[29-31], and with adaption to meet the unique needs of YMSM and their parents such prevention programs could be highly impactful[60,61]. It would also be informative to examine if the YMSM who may have participated in these family-based interventions show similar prevention effects as heterosexual young men. Second, more research is needed to inform the development of YMSM-specific programs. Given some of the inconsistent results across samples in the current study, moderators of effects should be explored in future research, as should greater attention to the specific dimensions of parenting practice being studied. Also needed is research that involves parents as participants in order to understand their needs and perspectives[20]. Studies of parents of YMSM are nearly non-existent to date, with only some exceptions[59,62]. Obtaining information only on youths' perspectives omits critical information needed to understand these bidirectional and dynamic relationships, as demonstrated by research with heterosexual youth that has shown parent and child reports convey unique information[63].

Findings from this study must be interpreted in the context of the limitations of the design. First, our study relied on adolescent self-report to measure their perspectives on parental knowledge and monitoring and the study outcomes. Second, two of the studies were cross-sectional and the longitudinal study only measured parenting variables on a single occasion. Longitudinal measurement of parenting practices and outcomes would allow for modeling of the dynamic bi-directional relationship between parenting and adolescent behaviors. Third, data for all three studies came from a single geographic location, and while the samples were racially/ethnically diverse, different results may be found in difference communities. Fourth, some of the participants in the Crew 450 and ChiGuys studies also later participated in the RADAR study. Concerns about how this may have impacted study findings are ameliorated by the fact that RADAR used a different measure of parenting so the same construct was not tested with the same participant more than once. Furthermore, sensitivity analyses were performed with the Crew 450 and ChiGuys participants removed from the RADAR sample and the findings were unchanged. Despite study limitations, our findings support the need for further research on the influences of parents on YMSM health risk behaviors and support the value of developing family- and parent-interventions that could address parents' roles in supporting healthy same-sex relationships, acceptance of child's sexual orientation, and more universal parenting practices such as monitoring.

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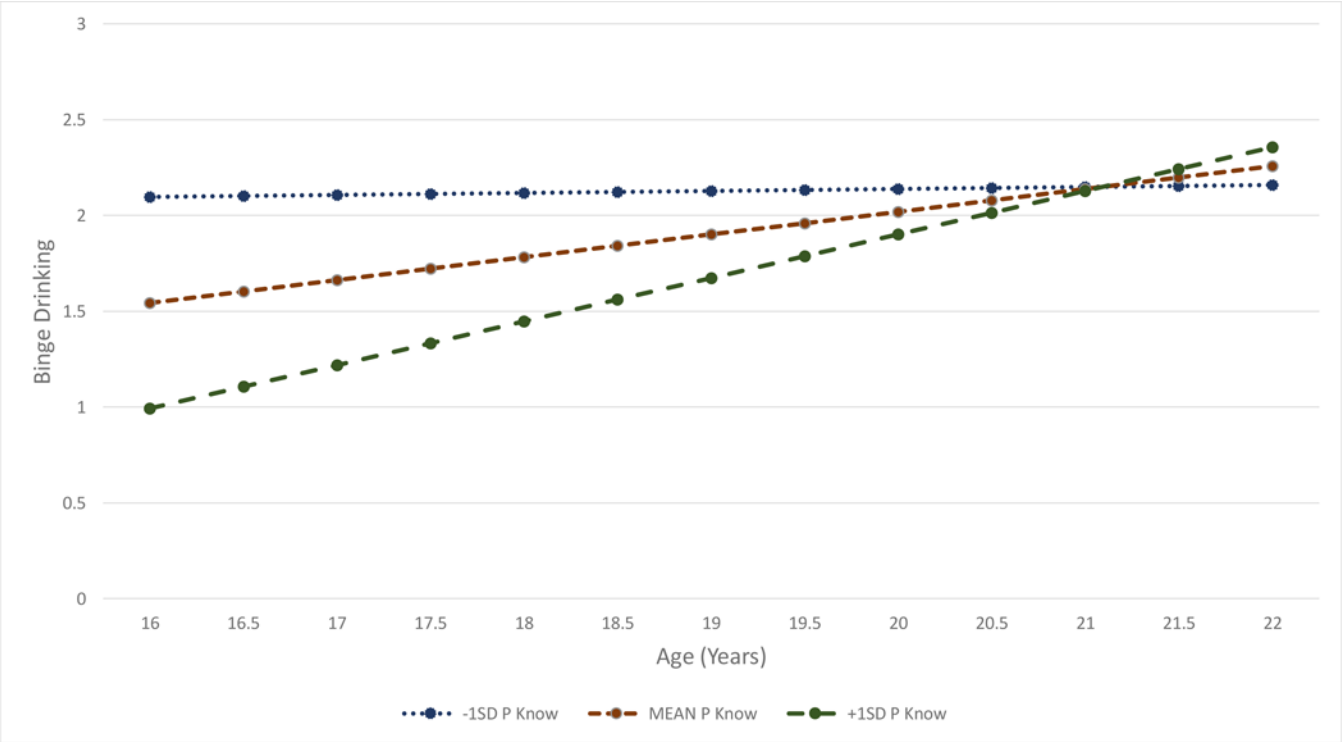

Figure 1.

Binge drinking levels across development by levels of parental knowledge in the Crew 450 sample.

NOTE: P Know = Parental Knowledge, SD = standard deviation. For the purpose of illustrating effects levels of binge drinking over time are plotted for baseline levels of parental knowledge 1 SD below the mean, at the mean, and 1 SD above the mean.

Table 1

Analytic Sample Demographics

	ChiGuys	Crew 450	RADAR
	N (%)	*N (%)*	*N (%)*
Race			
White	100 (44.4)	24 (10.3)	386 (39.3)
Black	92 (40.9)	128 (54.9)	442 (45.1)
Other	25 (11.1)	17 (7.3)	153 (15.6)
Ethnicity			
Hispanic	82 (36.4)	64 (27.5) *	292 (29.8)
Sexual Orientation			
Gay	144 (64.0)	176 (75.5)	676 (68.9)
Bisexual	74 (32.9)	45 (19.3)	210 (21.4)
Other	7 (3.1)	12 (5.2)	95 (9.7)
Live w/ Parent	208 (92.4)	233 (100.0)	341 (34.8)
Age, *M (SD)*	17.12 (.95)	18.54 (1.37)	21.52 (3.74)

Note: Seven participants in the ChiGuys sample did not identify their race/ethnicity so are excluded.

* Hispanic/Latino identity was included in the same question as race and therefore is mutually exclusive with the categories of race.

Table 2

Multivariate Negative Binomial and Logistic Regression Models for the ChiGuys Sample

	Binge Drinking (30 days)[1]	Marijuana Use (12 Months)[1]	Other Drugs (12 Months)[2]	CAS Acts (3 Months)[1]	# CAS Partners (12 Months)[1]
			M (SD)		
	1.20 (3.45)	1.67 (2.18)	.19 (.39)	3.93 (14.42)	.81 (2.34)
			Effect Estimates (95% CI)		
Age	1.98 (1.29:3.05) **	1.12 (0.93:1.35)	1.32 (0.87:1.99)	1.99 (1.21:3.27) **	1.50 (0.99:2.29)
Black	0.23 (0.11:0.48) ***	1.24 (0.89:1.75)	0.51 (0.23:1.11)	0.82 (0.34:1.95)	1.79 (0.83:3.83)
Hispanic	0.59 (0.24:1.47)	0.89 (0.59:1.34)	1.31 (0.62:2.74)	2.38 (0.97:5.83)	0.60 (0.27:1.32)
Age	0.66 (0.21:2.07)	1.33 (0.79:2.23)	0.46 (0.13:1.68)	0.79 (0.24:2.63)	2.00 (0.57:7.05)
Bisexual	1.80 (0.84:3.83)	1.29 (0.88:1.90)	2.41 (1.14:5.08) *	1.27 (0.47:3.42)	0.60 (0.27:1.34)
PSQ Knowledge	0.68 (0.47:1.00) *	0.89 (0.75:1.06)	0.75 (0.53:1.07)	0.58 (0.40:0.84) **	0.84 (0.61:1.15)

NOTE:

* p < .05,

** p < .01,

*** p < .001

[1] Negative binomial model with effect estimate as event rate ratios

[2] Logistic regression model with effect estimate as odds ratio. CAS = Condomless Anal Sex. PSQ = Parental Style Questionnaire.

Table 3

Multivariate Latent Growth Models for Crew 450 Sample

	Binge Drinking (6 Months)		Marijuana Use (6 Months)		Hard Drugs Used (6 Months)		CAS Acts (6 Months)		# CAS Partners (6 Months)	
	Baseline	**Slope**	**Baseline**	**Slope**	**Baseline**	**Slope**	**Baseline**	**Slope**	**Baseline**	**Slope**
	Unstandardized Estimate (95% CI)									
Intercept	3.32 (1.41:5.24) ***	−0.23 (−0.63:0.17)	1.78 (0.00:3.56)	0.61 (0.20:1.02) *	0.85 (0.05:1.65)	0.12 (−0.06:0.31)	−0.05 (−9.73:9.63)	2.90 (−0.56:6.36)	−0.15 (−1.39:1.09)	0.19 (−0.15:0.52)
Black	−0.62 (−1.75:0.51)	−0.18 (−0.44:0.13)	0.97 (−.06:1.99)	−0.75 (−0.99: −0.52) ***	−0.16 (−0.58:0.25)	−0.23 (−0.34: −0.11) **	4.37 (−1.27:10.02)	−1.90 (−4.31:0.50)	0.77 (−0.06:1.59)	−0.34 (−0.57: −0.11) *
Hispanic	−0.37 (−1.59:0.85)	−0.11 (−0.39:0.18)	0.66 (−0.42:1.74)	−0.67 (−0.94: −0.40) ***	0.20 (−0.36:0.76)	−0.23 (−0.38: −0.08) *	3.34 (−3.39:10.07)	−0.86 (−3.63:1.93)	0.62 (−0.21:1.45)	−0.21 (−0.45:0.03)
Other Race	0.00 (−1.74:1.74)	−0.15 (−0.56:0.25)	−0.13 (−1.99:1.73)	−0.49 (−0.91: −0.07) *	−0.11 (−0.64:0.41)	−0.22 (−0.35: −0.08) **	14.71 (3.01:26.41) *	−4.80 (−7.86:1.74) *	1.57 (0.42:2.72) *	−0.54 (−0.85: −0.24) **
Bisexual	0.23 (−0.69:1.15)	−0.05 (−0.24:0.15)	0.57 (−0.57:1.71)	−0.05 (−0.36:0.26)	0.07 (−0.37:0.50)	−0.05 (−0.15:0.06)	−5.83 (−13.06:1.40)	1.59 (−0.98:4.16)	−0.56 (−1.18:0.06)	0.08 (−0.85:0.24)
PSQ Knowledge	−0.56 (−0.90: −0.21) **	0.11 (0.03:0.18) *	−0.32 (−0.75:0.11)	0.03 (−0.09:0.15)	−0.18 (−0.35: −0.01)	0.16 (−0.01:0.08)	0.43 (−2.10:2.95)	−0.29 (−1.16:0.57)	−0.13 (−0.38:0.13)	0.00 (−0.08:0.08)

NOTE:

* p < .05,

** p < .01,

*** p < .001

CAS = Condomless Anal Sex. PSQ = Parenting Style Questionnaire.

Table 4

Multivariate Negative Binomial and Linear Regression Models for RADAR Sample

	Binge Drinking (6 Months)[2]			Marijuana Use (Last 30 Days)[1]			Hard Drugs Used (6 Months)[1]			CAS Acts (6 Months)[1]			# CAS Partners (6 Months)[1]		
	Full Sample	**18 and Under**	**19 and Over**	**Full Sample**	**18 and Under**	**19 and Over**	**Full Sample**	**18 and Under**	**19 and Over**	**Full Sample**	**18 and Under**	**19 and Over**	**Full Sample**	**18 and Under**	**19 and Over**
							M (SD)								
	1.01 (1.03)	.79 (.95)	1.09 (1.04)	2.85 (2.56)	2.26 (2.30)	3.07 (2.62)	.34 (.78)	.26 (.69)	.37 (.82)	17.82 (42.44)	11.37 (30.50)	19.97 (45.55)	4.79 (7.56)	4.30 (6.84)	4.96 (7.84)
	Unstd. Beta (95% CI)			Event Rate Ratio (95% CI)			Event Rate Ratio (95% CI)			Event Rate Ratio (95% CI)			Event Rate Ratio (95% CI)		
Age	0.03 (.01:.04)*	–	–	1.03 (1.02:1.05)*	–	–	1.07 (1.03:1.10)*	–	–	1.12 (1.07:1.17)*	–	–	1.07 (1.02:1.11)*	–	–
Black	−0.59 (−.73: −.45)*	−0.54 (−.80: −.29)*	−0.60 (−.76: −.43)*	1.19 (1.03:1.37)*	1.18 (.87:1.58)	1.19 (1.02:1.40)*	0.38 (.27:.53)*	0.22 (.08:.56)*	0.45 (.31:.65)*	0.79 (.55:1.13)	0.34 (.16:.68)*	1.02 (.69:1.51)	1.23 (.78:1.94)	3.11 (1.54:6.27)*	0.83 (.50:1.36)
Hispanic	0.11 (−.06:.28)	0.12 (−.17:.42)	0.12 (−.09:.32)	0.89 (.76:1.04)	1.12 (.79:1.60)	0.83 (.69:.99)*	0.81 (.57:1.15)	0.74 (.34:1.62)	0.81 (.55:1.20)	0.68 (.46:.99)*	0.98 (.47:2.01)	0.65 (.42:.99)*	0.74 (.47:1.16)	0.55 (.29:1.03)	0.70 (.39:1.25)
Other Race	0.00 (−.17:.17)	−0.13 (−.41:.16)	0.04 (−.17:.25)	0.98 (.83:1.16)	1.20 (.89:1.63)	0.90 (.74:1.09)	0.73 (.51:1.05)	0.85 (.41:1.74)	0.68 (.45:1.03)	0.91 (.63:1.33)	1.19 (.61:2.29)	0.78 (.50:1.22)	1.14 (.73:1.78)	0.95 (.51:1.77)	0.98 (.53:1.81)
Bisexual	0.06 (−.09:.22)	0.06 (−.20:.31)	0.09 (−.10:.28)	1.18 (1.03:1.35)*	1.13 (.85:1.50)	1.23 (1.05:1.43)	1.84 (1.33:2.53)*	1.13 (.56:2.26)	2.10 (1.47:3.00)*	0.90 (.59:1.38)	0.88 (.41:1.90)	1.06 (.60:1.85)	0.72 (.39:1.34)	0.51 (.26:.98)	1.16 (.55:2.46)
PFM Scale	−0.08 (−.17:.02)	−0.12 (−.31:.06)	−0.08 (−.19:.03)	0.85 (.77:.94)*	0.68 (.53:.87)*	0.89 (.81:0.99)*	0.67 (.54:.82)*	0.79 (.44:1.40)	0.65 (.52:.81)*	0.73 (.58:.91)*	0.66 (.41:1.06)	0.73 (.58:.93)**	0.85 (.66:1.09)	0.72 (.53:.96)*	0.94 (.69:1.30)

NOTE:

*p < .05;

[1]Negative Binomial Model,

[2]Linear Regression; PFM = Poor Family Management.