

Body Mass Index, Body Esteem, and Unprotected Receptive Anal Intercourse Among Young Men Who Have Sex with Men Who Seek Partners Online

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Abstract Research examining the relationship between body mass index (BMI) and sexual risk outcomes among men who have sex with men (MSM) has yielded inconsistent results. Using a web-based survey, single-identified (e.g., not in a relationship) young MSM ($N = 431$) between the ages of 18 and 24 years who sought romantic partners online were asked to respond to items regarding their BMI, body image (e.g., attribution, dissatisfaction, and pride), and sexual risk behaviors. We used Poisson regressions to examine the relationships between BMI, body image, and the number of unprotected receptive anal intercourse (URAI) occasions and partners in the past 2 months. We found a curvilinear relationship between BMI and URAI occasions, and a linear relationship between BMI and URAI partners. These relationships persisted after accounting for body image. Further, we found that body attribution served as a protective factor whereas body pride served as a risk factor. We discuss the implications of our findings for sexual health education and HIV prevention.

Keywords Sexual orientation · Body image · Sexual risk · Internet · Mental health · Self-concept

Introduction

Young men who have sex with men (YMSM) in the United States continue to be disproportionately affected by HIV and AIDS (Prejean et al., 2011). Prejean et al. estimated that

YMSM comprised 69 % of new infections among youth ages 13–29 years old in the United States, reflecting an increasing trend within this population since 2006. Researchers have conducted numerous studies identifying individual and psychosocial factors that place YMSM at risk of acquiring HIV (DiClemente et al., 2008; Mustanski, Newcomb, DuBois, Garcia, & Grov, 2011). Recently, researchers have claimed that body mass index (BMI) may be a correlate of sexual risk, serving as a proxy for physical (e.g., excess fat deposits in abdomen and/or penis causing difficult condom use) or psychological (e.g., body image) factors (Moskowitz & Seal, 2010). To date, however, the empirical support for these proposed relationships remains underdeveloped and warrants concurrent testing. Consequently, we examined how physical (e.g., BMI) and psychological (e.g., body image) characteristics may influence YMSM's sexual risk behaviors.

Body Mass Index and Sexual Risk

Researchers have attempted to explain how different body types, as measured by BMI, are related to sexual risk among men who have sex with men (MSM). The relationships between these two specific constructs (BMI and sexual risk) have been found to be inconsistently associated; therefore, it remains unclear as to how these relationships manifest in the lives of MSM. We briefly review prior studies examining the relationship between BMI and sexual risk among MSM, highlighting potential explanations for divergent findings.

Some researchers have noted a positive relationship between BMI and sexual risk. Moskowitz and Seal (2010), for example, found that increased BMI was associated with decreased condom use in a sample of predominantly white homosexual-identified men ($N = 576$; average age = 40.7 years), concluding that men with higher BMI scores were less likely to reject sexual partners as a result of having a decreased amount of anal intercourse

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partners, even when condom use was challenged. In a sample of predominantly White MSM ($N = 535$; median age = 34.1 years), Allensworth-Davies, Welles, Hellerstedt, and Ross (2008) also reported that overweight MSM were more likely to report comparable UAI as MSM of average weight, but overweight/obese and average MSM reported greater UAI than underweight participants. Contrary to these findings, other scholars have noted a negative relationship between BMI and sexual risk behavior. Kraft, Robinson, Nordstrom, Bockting, and Rosser (2006) found a negative relationship between BMI and HIV/AIDS risk, positing that sexual partners of MSM with increased BMI were more likely to insist on condom use due to the belief that thinner, more attractive men were less likely to be infected. From a sample of 316 self-identified MSM, ranging from ages 18 to 72 years, they concluded that BMI below the obesity cutoff was a strong risk factor for unsafe sex. Finally, some scholars have noted no relationship between BMI and sexual risk behaviors (Guadamuz et al., 2012).

These differences may be attributable to different measurement considerations and sample characteristics. When examining the relationships between BMI and sexual risk behaviors, researchers have operationalized sexual risk as the overall number of unprotected (condomless) sexual intercourse occasions or as the likelihood of engaging in inconsistent condom use. Though these definitions hold true as sexual risk behaviors, they may have been confounded by sexual roles (insertive versus receptive) and the perceived HIV/AIDS risks attributed to these sexual positions (Johns, Pingel, Eisenberg, Santana, & Bauermeister, 2012; Klein & Tilley, 2012).

Inconclusive data may also be attributable to inconsistent measurements of BMI. In most studies (Allensworth-Davies et al., 2008; Guadamuz et al., 2012; Kraft et al., 2006), sexual risk differences have been examined using BMI categories (e.g., underweight, normal weight, overweight, and obese). The treatment of BMI as categories may reduce its variability and hinder the detection of observed relationships across studies. Moskowitz and Seal (2010), on the other hand, treated BMI as a continuous metric. The treatment of BMI as a continuous indicator may also be inadequate as it may suggest that its relationship with sexual risk is monotonic and linear. Given the inconsistent findings across studies, it may be possible that the association between BMI and sexual risk across studies follows a non-linear relationship.

For the most part, BMI scores have been calculated using self-reported measures of height and weight (Guadamuz et al., 2012; Kraft et al., 2006; Moskowitz & Seal, 2010) while other methods were not specifically reported (Allensworth-Davies et al., 2008). Self-report measures of BMI have often been subject to issues related to internal validity, largely due to social desirability. Studies have shown trends of under-reporting for weight and over-reporting for height (Gorber,

Tremblay, & Gorber, 2007). Inaccurate reporting, therefore, may have threatened reliable conclusions of BMI's influence on sexual risk. Additionally, validity issues may have arisen as a result of comparing subjective experiences (e.g., body image measures) through self-reports (Peat, Peyerl, Feraro, & Butler, 2011), as body image among men may be influenced by sociocultural factors (e.g., gender socialization and sexual orientation).

Finally, age distributions should be carefully considered when treating BMI as a predictor. Age has been shown to be a confounder in measuring BMI and body image with samples of large age ranges. Sorkin, Muller, and Andres (1999) asserted that indices of obesity like BMI change with age, largely because height and weight changes occur across the life course. Youth gain height as they age, which normalizes during adulthood, and then decreases with older age. Body composition may also change with age, particularly through decreasing muscle and organ masses as well as bone density with older age (Borkin, Hults, Gerzof, Robbins, & Silbert, 1983). Taken together, these findings suggest that the association between BMI and sexual risk may operate differently across ages; thus, prior findings with older MSM may not be applicable to YMSM.

Body Image and Sexual Risk

The relationship between sexual risk and body image is heavily influenced by MSM's weight (Peplau et al., 2009). The pressure to conform to body ideals among MSM has been motivated by the desire to attract other men (Peplau et al., 2009; Wiseman & Moradi, 2010). In conforming to expectations of physical attraction, MSM may experience and internalize a heightened social pressure (Morrison, Morrison, & Sager, 2004; Reilly, Yancura, & Young, 2012). These expectations emphasize an importance of thinness and muscularity, which have been shown to be valued components of body image among MSM (Martins, Tiggemann, & Kirkbride, 2007). Drummond (2005) also noted that an additional dueling pressure to conform to heteronormative expectations of society (e.g., projecting masculinity through characteristics of the body and demeanor) has encouraged MSM to scrutinize their behaviors (e.g., making their bodies "look heterosexual at times"), impelling them to adapt perceivably heteronormative images when necessary. When unmet, these expectations may have a deleterious effect on individuals' self-concept, an already identified risk correlate of HIV (DiClemente et al., 2008). Therefore, social expectations (e.g., body attributions) should be considered when examining the relationship between body image and sexual risk.

Men who do not fulfill stereotypical body expectations may be subjected to stigma and, therefore, may be more likely to report body dissatisfaction. Body dissatisfaction may, in turn, increase their likelihood to engage in HIV/AIDS risk

behaviors. Brennan, Craig, and Thompson (2012), for example, found that participants with greater body dissatisfaction were more likely to report prior sexually transmitted infection (STI) diagnoses that were not HIV. Similarly, Peplau et al. (2009) found that MSM who were categorized as being obese were most likely to report feeling unattractive, uncomfortable in a swimsuit, and dissatisfied with their weight. Consequently, it is possible that body dissatisfaction may influence YMSM's psychological well-being negatively and, in turn, increase their likelihood to engage in sexual risk behaviors due to low self-valuation.

On the other hand, Allensworth-Davies et al. (2008) found that the promotion of an “image-driven gay culture” (Drummond, 2006) might serve as a protective factor against unprotected anal intercourse (UAI). Specifically, Allensworth-Davies et al. found that being underweight served as a protective factor against UAI when accounting for body satisfaction. Men who fit the ideal body mold may have greater body esteem and, therefore, be more likely to engage in health behaviors that place them at less risk for STIs, in addition to engaging in behaviors that enhance their image to be seen as attractive and disease free (Tylka & Andorka, 2012). Kaminski, Chapman, Haynes, and Own (2005) have also suggested that one's ability to conform to the body aesthetics implicitly regulated by the MSM community has an empowering effect that mitigates the likelihood of engaging in sexual risk behaviors which, in turn, increases sex appeal when seeking partners. Taken together, these findings on men's body satisfaction and desire to remain healthy (e.g., body pride) may be a protective factor.

Age is also inextricably tied to body image among MSM. Grierson and Smith (2005) have suggested that the way MSM experience their sexual identities depends on salient socio-political culture changes in their minds when developing these identities. For example, MSM who lived during the height of the AIDS epidemic may hold different body ideals than MSM of more recent generations. More specifically, older MSM may desire to have a bigger, more muscular frame since thinner bodies were associated with wasting away from HIV (Tate & George, 2001). Younger generations of MSM, on the other hand, may be less attuned to the body stereotypes associated with a person infected with HIV and characterize body image expectations differently than their older counterparts. In addition, Drummond (2006) has argued that young MSM are more affected by cultural expectations in which attractiveness is guided by “body physique, fashion, and personal grooming,” given that the “image-driven gay culture” reinforces youth as a desirable trait.

Taken together, these findings suggest that body image and sexual risk are inextricably linked; however, these relationships seem to vary based on whether body image is conceptualized as a promotive (e.g., body pride) or risk (e.g., body dissatisfaction) factor, as well as by how individuals perceive that their body fits social expectations (e.g., body attribution).

Consequently, in our study, we examined how sexual risk was associated with these multiple body image domains (e.g., attribution, esteem, dissatisfaction). Further, we account for BMI as a physical characteristic influencing the relationship between body image and sexual risk.

Study Goals and Objectives

Our study had three objectives. First, we sought to address and compare the inconsistencies in the existing literature regarding suggested associations (nonexistent, linear, and curvilinear) between BMI and sexual risk behaviors among receptive YMSM. Additionally, we addressed generational confounding by focusing on MSM ages 18–24. Second, we examined the associations between sexual risk behavior and the three aforementioned body image domains (body attribution, body esteem, and body dissatisfaction), respectively. Finally, we examined whether the association between BMI and sexual risk behaviors would disappear or attenuate once body image was taken into consideration.

Method

Participants

Data for this article come from a cross-sectional observational study examining YMSM's dating experiences online (Bauermeister, Leslie-Santana, Johns, Pingel, & Eisenberg, 2011). To be eligible for participation, recruits had to be between the ages of 18 and 24 years, report having used a dating website in the past 3 months, report having been sexually active with a male partner met on a dating website in the past 6 months, and report being single. Only single participants were included in the original study to capture a common context by which these youth seek new partners.

Participants were primarily recruited through advertisements on two popular social networking sites, participant referrals, and flyers posted at local venues commonly frequented by YMSM. Social network advertisements were viewable only to men who fit our age range and who lived in the United States. Promotional materials displayed a synopsis of eligibility criteria, a mention of a \$15 iTunes gift card incentive, and the survey's website. In our advertisements, we did not define “dating websites” to ensure inclusivity of sites that were marketed for romance or for broader social purposes such as “hooking up.” Sites typically used for “hooking up” or “seeking casual sex” were included under the assumption that some youth seek casual sex on the path to finding romantic partners. By using these sites, we could account for participants who may be using them for purposes beyond casual sex.

A total of 548 entries were recorded between December 2009 and March 2010. We removed duplicates and falsified entries ($N = 49$; 8.9 % of all entries) by examining participants' email addresses, IP addresses, and operating system and browser information (Bauermeister et al., 2012). We concluded with an analytic sample of $N = 499$ sexual minority youth, of which 52 (10 %) were eligible and consented but did not commence the survey (e.g., a study completion rate of 89.6 %). The vast majority of participants self-identified as gay or homosexual ($N = 380$; 85.0 %) or bisexual ($N = 51$; 11.4 %). Given the few observations in other sexual and gender identity categories, we excluded from this report those participants who self-identified as heterosexual or other ($N = 3$; 0.4 %), were transgender ($N = 6$; 1.6 %), or had missing data on their sexual identity ($N = 7$; 1.6 %). We include a description of the final sample ($N = 431$) in “Results”.

Procedure

The web-survey was developed using current web-survey recommendations (Couper, 2008) and pilot tested prior to data collection. Study data were protected with a 128-bit SSL encryption and kept within a University of Michigan firewalled server. Upon entering the study site, participants were asked to enter a valid and private email address, which served as their username. This allowed participants to save their answers and, if unable to complete the questionnaire in one sitting, continue the questionnaire at a later time. As a nationwide survey, participants were asked to provide contact information prior to informed consent and eligibility screening to prevent participation duplication (Bauermeister et al., 2012). Participants were asked to answer four questions (e.g., age, relationship status, use of the Internet, sexual activity with partner met online) to determine their eligibility. Eligible youth were presented with a detailed consent form that explained the purpose of the study (e.g., exploring how YMSM use the Internet for dating), their rights as participants, and asked to acknowledge that they read and understood each section of the consent form.

Consented participants then answered a 30–45 min questionnaire that covered assessments regarding their sociodemographic characteristics, HIV status, Internet use, relationship ideals, sexual and substance use behaviors, and general mood over the last few months. For those questionnaires that were incomplete, participants were sent two reminder emails that encouraged them to complete the questionnaire; one email was sent a week after they had started the questionnaire and another was sent a week before the questionnaire was scheduled to close. Participants were compensated with \$15 in iTunes gift cards via e-mail upon completion of the questionnaire. We acquired a Certificate of Confidentiality to protect study data. The University of Michigan Institutional Review Board approved all study procedures.

Measures

We include descriptive statistics for variables included in this report in Table 1.

Sexual Behavior

Participants were asked to report their sexual behavior with men and women during the previous 2 months using the Sexual Practices Assessment Schedule (Carballo-Diéguez, Dolezal, Nieves-Rosa, & Díaz, 1995). Questions were posed both in formal language and vernacular (in italics) to increase comprehension. For this report, we include questions regarding the total number of unprotected receptive anal intercourse (URAI) occasions and partners, respectively. In order to take a risk reduction approach, our study observed URAI under the assumption that it is the highest sexual risk behavior for acquiring an STI or HIV among MSM, as documented in previous literature (Jin et al., 2010). We assigned a value of zero to participants who reported not having engaged in URAI with their male partners in the past 2 months.

Body Image

Adapting items from the Manual for the Body-Esteem Scale for Adolescents and Adults (BESAA), participants were asked items about their body image (Mendelson & White, 1998). We used 15 of the 23 BESAA items (see Table 2), each rated on a 5-point scale ranging from 0 (Never) to 4 (Always), based on a confirmatory factor analysis that removed cross-loaded items (Meanley, Hickok, Johns, & Bauermeister, 2012). We extracted three orthogonal factors. The first factor, *body dissatisfaction*, referred to men's negative perceptions of their own body image (e.g., “I feel ashamed of how I look.”). The body dissatisfaction factor explained 39.20 % of the total variance and had strong reliability (six items; Cronbach's $\alpha = 0.86$). The second factor, *body attribution*, referred to how YMSM believed their body image was perceived by others (e.g., “Other people consider me good looking.”). Body Attribution explained an additional 13.47 % of the total variance and also had strong reliability (five items; Cronbach's $\alpha = 0.82$). The last factor, *body pride*, assessed participants' positive attitudes about their body (e.g., “I'm proud of my body.”). The Body Pride factor (four items; Cronbach's $\alpha = 0.88$) explained an additional 4.22 % of the total variance.

We noted a negative correlation ($r = -.31$, $df = 429$, $p < .001$) between body dissatisfaction and body attribution, a positive correlation between body attribution and body pride ($r = .69$, $df = 429$, $p < .001$), and a negative correlation between body appearance and body pride ($r = -.42$, $df = 429$, $p < .001$).

Table 1 Sample characteristics

	Underweight (<i>N</i> = 24)	Normal (<i>N</i> = 261)	Overweight (<i>N</i> = 85)	Obese (<i>N</i> = 41)
URAI unprotected receptive anal intercourse				
Age (in years) (<i>M</i> , <i>SD</i>)*	20.92 (1.77)	21.32 (1.99)	21.80 (1.93)	22.07 (1.88)
Minority (<i>N</i> , %)	9 (37.5 %)	65 (24.9 %)	25 (29.4 %)	11 (26.8 %)
<i>Body esteem</i> (<i>M</i> , <i>SD</i>) ^a				
Body attribution**	3.52 (.83)	3.73 (.76)	3.24 (.83)	2.93 (.92)
Body dissatisfaction	3.06 (1.17)	2.92 (.92)	2.94 (.93)	3.30 (.94)
Body pride**	3.25 (.82)	3.37 (.88)	2.55 (.97)	2.45 (1.03)
<i>Sexual behavior</i> (<i>M</i> , <i>SD</i>)				
URAI occasions ^b	0.58 (.83)	1.49 (4.2)	2.05 (7.94)	3.32 (6.36)
URAI partners ^b	0.63 (.92)	.83 (2.65)	.52 (1.05)	1.76 (4.50)

* $p < .05$; ** $p < .001$ ^a Absolute range, 0–4^b Raw scores are presented in the table; however, given the non-normal distribution of these variables, we used the log-10 transformation to test mean differences across BMI categories

Body Mass Index

BMI was calculated using the standard formula: $[(\text{weight}/\text{height}^2) \times 703]$. Participants' scores were categorized into four weight groups as recommended by the Centers for Disease Control and Prevention (2011). These categories included underweight (<18.5), normal weight (18.5–24.9), overweight (25–29.9), and obese (≥ 30.0). BMI categories were used initially in our ANOVA analyses to assess differences in body esteem scores among participants. For our regression analyses, BMI was coded as a continuous variable. In non-linear models, we include a mean-centered BMI term ($M = 23.90$) and a quadratic term.

Demographic Characteristics

Participants were asked to report their age (in years). Participants were also asked to report their race/ethnicity: White or European American, Latino or Hispanic, African American or Black, Asian or Pacific Islander, Native American, and other. Due to small ranges of age and small variances in race/ethnicity, we dichotomized age (0 = ages 18–20; 1 = ages 21–24) and race/ethnicity (0 = White; 1 = Non-White).

Data Analytic Strategies

We first examined whether the variables of interest varied by BMI categories. We then used χ^2 and ANOVA to test for differences by BMI categories across categorical and continuous variables, respectively. We then conducted multivariate analyses using Poisson regression to account for the non-normal distribution of our sexual behavior outcomes. We created a three block Poisson model for each outcome. The first model examined the linear relationship between BMI, after accounting for age and race/ethnicity. We then proposed a second model where we entered the mean centered BMI score alongside its quadratic term. This model allowed us to examine whether the relationship between BMI and sexual behavior had a non-linear relationship. In our third and final

Table 2 Body esteem factor items

	<i>M</i>	<i>SD</i>
<i>Body attribution</i> ($\alpha = 0.82$)		
Other people consider me good-looking	3.85	.86
People my own age like my looks	3.56	1.07
My looks help me to get dates	3.44	1.20
I'm as nice looking as most people	3.55	1.04
My appearance would help me get a job	3.28	1.29
<i>Body dissatisfaction</i> ($\alpha = 0.86$)		
My looks upset me	2.35	1.18
There are a lot of things I'd like to change about my looks if I could	3.36	1.21
I wish I looked like someone else	2.83	1.39
I wished I looked better	3.68	1.39
I worry about the way I look	3.35	1.27
I feel ashamed of how I look	2.23	1.18
<i>Body pride</i> ($\alpha = 0.88$)		
I think I have a good body	3.06	1.21
I'm proud of my body	3.05	1.17
I'm pretty happy about the way I look	3.38	1.11
I'm looking as nice as I'd like to	2.93	1.11
Absolute range, 0–4		

model, we included the three body esteem factors in order to examine their independent relationships with the outcomes, as well as to examine whether the inclusion of these variables would suppress the observed relationships with BMI. Furthermore, we examined whether the inclusion of a new set of variables improved the model fit by examining the likelihood ratio χ^2 tests. Inclusion criteria for variables were set at a .05 significance level.

Results

Study Sample

Close to two-thirds of participants ($N = 261$; 63.5 %) ranged within the average BMI category. Overweight participants

($N = 85$; 20.7 %) accounted for another fifth of the sample, followed by obese ($N = 41$; 10 %) and underweight participants ($N = 24$; 5.8 %). When we compared BMI categories across age groups, we found that older participants (ages 21–24 years) accounted for a greater proportion of normal, overweight, and obese cases, respectively, than their younger counterparts (ages 18–20 years). There were no significant differences in BMI categories by race, URAI partners, or URAI occasions (see Table 1).

We found mean differences in body attribution across BMI categories. In Tukey post hoc analyses, obese participants reported less positive body attributions than participants in the underweight and normal BMI categories, respectively. Overweight participants also noted less positive body attributions than their counterparts in the normal BMI category. We did not observe differences in body attribution scores between the underweight and normal categories or between overweight and obese participants, respectively.

We also noted mean differences in body pride across BMI groups. Participants in the underweight BMI category reported higher body pride scores than counterparts in the overweight and obese categories, respectively. We noted similar differences among participants in the normal BMI category as compared to those in the overweight and obese groups, respectively. We noted no body pride differences between the underweight and normal categories, or between overweight and obese participants. Lastly, we noted no significant mean differences in body dissatisfaction across BMI categories.

Multivariable Model

Unprotected Receptive Anal Intercourse Occasions (URAIO)

We found a positive relationship between URAIO and BMI in our initial model, after accounting for age and minority status (see Table 3). We then included a quadratic term for BMI in our second model. As shown in Fig. 1, we found that the relationship between BMI and URAIO was non-linear. Participants who reported having a BMI of 27 or under had lower odds of engaging in URAIO, whereas participants reporting a BMI greater than 27 had greater odds of engaging in URAIO with every additional BMI unit increase. As a final step, we included the three body esteem factors into our model; inclusion of these covariates did not affect the relationship between BMI and URAIO. We found a negative relationship between URAIO and body attribution. Conversely, we noted a positive association between URAIO and body pride. We found no significant relationship between body dissatisfaction and URAIO in our multivariate model.

Unprotected Receptive Anal Intercourse Partners (URAIP)

We found a positive relationship between URAIP and BMI in our initial model, after accounting for age and minority status. The inclusion of the quadratic term for BMI did not improve the model fit; therefore, it was excluded from subsequent analyses (see Table 3). We then included the body esteem factors into our model. Body pride was associated with URAIP. We found no significant relationship between URAIP and body dissatisfaction or body attribution, respectively. The relationship between BMI and URAIP remained after accounting for the body esteem factors.

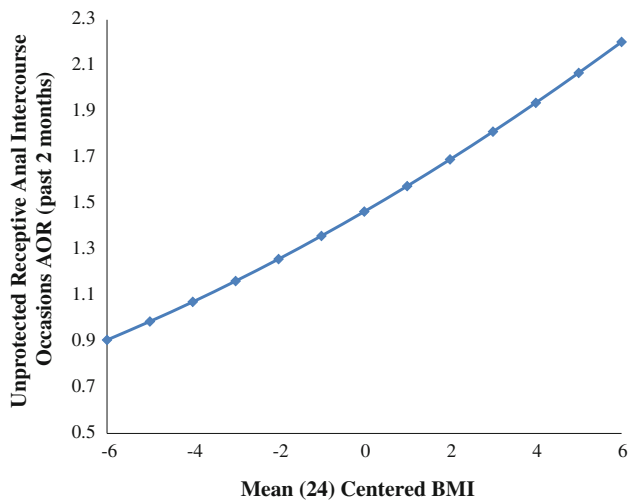
Discussion

We sought to examine the relationship between BMI and sexual risk behavior, taking into account potential confounders (e.g., variations in age ranges, BMI measurement, assumptions about linearity, and sexual risk outcomes) that could explain prior divergent findings in the literature. We found evidence to suggest that these methodological considerations helped explain the divergent findings in the literature. We noted a linear relationship between BMI and the number of URAI partners, suggesting that YMSM with higher BMI were more likely to have multiple partners with whom they adopted the receptive role when having unprotected sex. Consistent with findings by Allensworth-Davies et al. (2008), we also found a curvilinear relationship between BMI and the number of occasions of unprotected receptive anal sex among YMSM in our sample. As shown in Fig. 1, YMSM who reported having a BMI under 27 (slightly overweight) were less likely to engage in URAI occasions whereas YMSM with a higher BMI reported greater odds of engaging in multiple unprotected occasions. These findings align with Moskowitz and Seal's (2010) argument that YMSM with higher BMI may adopt the receptive role in a sexual encounter because their weight may dissuade them from being the insertive partner in a sexual encounter, because they have less confidence in their ability to negotiate condoms with a sexual partner, or because they express discomfort when wearing a condom. Future research examining whether the aforementioned psychosocial motivators mediate the relationship between BMI and sexual risk behavior is warranted.

We also examined whether the relationship between BMI and sexual risk could serve as a proxy for body esteem; however, we found that BMI remained independently associated with URAI outcomes after accounting for body esteem factors (e.g., attribution, dissatisfaction, and pride) in our multivariate analyses. This may have resulted, in part, because of the physical factors related to comfort or difficulty of condom use suggested by Moskowitz and Seal (2010). In prior studies,

Table 3 Poisson regressions ($N = 252$) examining the association between URAI behaviors and BMI and body esteem

	OR	95 % CI	OR	95 % CI	OR	95 % CI
<i>URAI occasions</i>						
Intercept	.56***	.39, .80	1.86***	1.49, 2.32	1.47	.81, 2.65
Age	.59***	.50, .69	.59***	.51, .69	.60***	.51, .700
Race	2.33***	1.86, 2.92	2.37***	1.89, 2.97	2.43***	1.94, 3.06
BMI	1.05***	1.04, 1.06	1.07***	1.05, 1.09	1.08***	1.05, 1.10
BMI ²			0.99*	0.99, 1.00	0.99*	0.99, 1.00
Body attribution					0.83**	0.73, 0.95
Body dissatisfaction					0.97	0.88, 1.06
Body pride					1.35***	1.21, 1.51
Likelihood χ^2 (df)	150.33(3)***		154.27(4)***		189.90(7)***	
<i>URAI partners</i>						
Intercept	.64	.39, 1.04	1.42**	1.10, 1.83	.12*	.05, .33
Age	.83	.66, 1.04	.83	.67, 1.03	.87	.70, 1.09
Race	1.11	.86, 1.43	1.13	.87, 1.45	1.16	.90, 1.50
BMI	1.03***	1.02, 1.05	1.05**	1.02, 1.08	1.04***	1.02, 1.06
BMI ²			1.00	0.99, 1.00		
Body attribution					.84	.70, 1.02
Body dissatisfaction					1.13	1.00, 1.28
Body pride					1.62***	1.37, 1.91
Likelihood χ^2 (df)	13.02(3)**		14.59(4)**		53.14(6)***	

**Fig. 1** Adjusted odds ratios of engaging in URAI as a function of BMI (mean centered at 24). Line represents curvilinear relationship between BMI and sexual risk moderated by body esteem

researchers have noted that normative pressures to conform to a body ideal (e.g., body attribution) may affect MSM's self-concept which, in turn, influences their HIV/AIDS risk. We found fewer normative concerns about their body were less likely to report having multiple URAI occasions in the past 2 months. On the other hand, we found no significant association between body dissatisfaction and URAI partners. These findings suggest that body attribution's influence on HIV/AIDS risk

may operate via condom negotiation during sexual encounters rather than through partner availability and selection. YMSM who feel less social pressure regarding their attractiveness may feel more comfortable in discussing safer sex practices and/or enact more sexual relationship power when negotiating condoms with their partners. Future research examining the ways in which YMSM's condom self-efficacy and sexual relationship power varies as a result of body attribution scores may be warranted. This may highlight an opportunity to discuss how community norms regarding attractiveness are addressed as part of HIV/AIDS empowerment interventions for YMSM.

Although prior research has suggested that men with greater body dissatisfaction may be more likely to engage in unprotected sex due to low self-valuation (Martin & Knox, 1997), we found no support for this perspective. This non-significant finding may be a result of limited variability across BMI ranges (e.g., participants' feelings of dissatisfaction were comparable across BMI groups). This suggests that body ideals may vary across BMI groups and that these youth are dissatisfied in different ways (e.g., thinner youth strive to be more muscular whereas overweight youth strive to be thinner). Furthermore, we noted greater variability in mean item scores for the body dissatisfaction scale than for body attribution and body pride, respectively. Consequently, it is also plausible that participants provided socially desirable answers when answering body dissatisfaction items (e.g., "I feel ashamed of how I look"). Even though this scale has been previously validated with heterosexual young adults, ubiquitous messages promoting

an “image-driven gay culture” (Drummond, 2006) may promote insecurities regarding perceived attractiveness regardless of body size (Duggan & McCreary, 2004; Rosser et al., 2012) and may make YMSM participants’ more self-aware when answering these questions. Research seeking to decrease social desirability through subtler item wording may be warranted for this population.

Contrary to body dissatisfaction, body pride has been posited to serve as a protective factor as it may encourage men to take care of their bodies and reduce behaviors that could jeopardize their health. Our findings, however, suggested the opposite. YMSM who reported a greater body pride were more likely to report a higher number of URAI occasions and partners. This finding may reflect how men’s self-confidence may help them catalyze a greater number of sexual encounters, increasing their opportunities to engage in unprotected sex. Consequently, it is plausible that body pride may increase YMSM’s optimistic bias which, in turn, reduces their perceived susceptibility to HIV/AIDS. In prior studies, for example, researchers have noted that YMSM who attributed their weight to the misconception that leaner bodies insinuate healthier, disease-free bodies, may feel less at risk, especially if their partner is of the same weight category (Kaminski et al., 2005; Kraft et al., 2006). Given that the relationship between body pride and sexual risk behavior persisted after accounting for BMI, our findings build on these prior findings by suggesting that this optimistic bias may be present across body size categories. Qualitative and quantitative research examining how body pride may influence HIV susceptibility warrants attention.

Our study was not without several limitations. First, our BMI data were calculated based on self-report measures. As McAdams, Van Dam, and Hu (2007) asserted, BMI is subject to inaccuracies because of random and systematic errors, affecting the validity, particularly given that individuals tend to over-report their height and under-report their weight. They also noted that the inability for BMI to distinguish between fat and lean tissue complicates the ability to distinguish between individuals who have a high BMI due to muscle rather than fat. Future research should consider in-person measurements of body composition to improve our measurement of BMI. In addition, body image may be a sensitive subject and thus participants may have provided socially desirable answers.

We acknowledge that the generalizability of our findings may be limited given our study selection criteria (e.g., YMSM who sought partners online). Nevertheless, online partner-seeking continues to be increasingly common for YMSM (Bolding, Davis, Hart, Sherr, & Elford, 2005). Given that many of these platforms rely on images as a tool for partner selection, it remains vital that we understand how perceptions of attractiveness may influence HIV/AIDS risk behaviors. Replication of our findings with other populations may be warranted. Though our findings do not generalize to YMSM altogether, our study yielded important implications regarding body

image and sexual risk among YMSM who use the Internet to meet new partners. Online dating permits a method of impression management, particularly via visual presentations that allow users to decide what parts of their appearance they choose to exhibit or conceal (Ellison, Heino, & Gibbs, 2006). As a result, body type realities and expectations may be skewed from an impression management focus on perceived assets and stereotypes of body ideals perpetuated through the thin/muscular stereotype.

The propagation of these body ideals through dating and “hook-up” websites targeting YMSM may superficially instill false associations between healthiness, body image, and attractiveness (e.g., optimistic bias). Youth with high BMI scores may engage in upward social comparison against potential partners as well as against body ideal stereotypes, using oneself as a reference for body and weight comparison. This, in turn, may create a stronger optimistic bias, depleting perceptions of risk when engaging in unprotected receptive intercourse. Upward body esteem comparison has been observed to increase people’s needs for social approval (Schwartz & Andsager, 2011). In the context of sexual risk for these youth, social approval may manifest as UAI. Therefore, it may be practical to intervene with online dating and “hook-up” social networks targeting YMSM to explicitly dispel myths connecting body ideals to low-risk activities and partners. This would be especially practical since MSM tend to be receptive to the idea of online health promotion (Bolding, Davis, Sherr, & Elford, 2004). At present, however, we were unable to test whether YMSM’s time spent online influenced their body esteem. Future research examining whether online representations of body ideals influence YMSM’s body esteem and subsequent sexual risk practices is warranted.

From an objectification theoretical standpoint, MSM not only objectify potential partners, but may engage in self-objectification as well; therefore, online dating and partner-seeking websites may foster an environment in which a user can create an impression as desirable as possible (Martins et al., 2007). From a social exchange perspective (Pulerwitz, Gormaker, & Dejong, 2000), YMSM with higher BMI or lower body esteem may therefore feel relegated to a position of powerlessness within a sexual encounter or, alternatively, may be willing to forego condoms to entice a prospective partner. This is particularly meaningful for YMSM as HIV-negative MSM tend to underestimate their risk of acquiring HIV (Klein & Tilley, 2012) or attribute low HIV risk to potential partners who conform to the thin/muscular body ideal. Future research examining whether (or how) YMSM’s body esteem influences their sexual relationship power and safer sex communication skills may inform new strategies to reduce their HIV/AIDS risk.

In sum, our findings suggest that BMI and body esteem factors may have independent influences on YMSM’s sexual risk behaviors. Previous efforts with MSM have discussed body image’s relation to HIV (UCSF Center for AIDS

Prevention Studies & AIDS Research Institute, 2001), promoted positive sexual body images in youth (UCSF Center for AIDS Prevention Studies & AIDS Research Institute, 2006), developed online modules to explore body image concerns of MSM (Rosser et al., 2010), and focused on body dissatisfaction (Brennan et al., 2011). Our study contributes to this prior work by examining its potential implications for approaches to HIV prevention among HIV-negative YMSM. Future interventions regarding body image and its relation to sexual risk behaviors among YMSM should include critical discussions regarding social norms (e.g., body attribution) and optimistic bias regarding HIV risk (e.g., body pride). Research is also needed to identify effective strategies to empower men about their bodies, and fight against a perceived social standard of which they may feel compelled to conform. Consistent with Robinson, Bockting, Rosser, Miner, and Coleman's (2002) argument, future interventions addressing body image will require that YMSM have an opportunity to challenge the belief that there is a single standard of beauty and to foster their self-acceptance in a culturally sensitive manner. Future research examining how BMI and body image manifest in YMSM's lives is warranted, as they may provide insights regarding how to integrate these constructs into sexuality education and HIV prevention strategies.

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