

Obesity, Body Image, and Unsafe Sex in Men who have Sex with Men

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Abstract Little is known about the relationship among body weight, body image, and HIV/AIDS sexual risk behaviors. We examined this issue in a midwestern U.S. metropolitan area community sample of 316 men who have sex with men, a group at relatively high risk for HIV/AIDS. All data were self-reported by questionnaire using standard items to assess current body image, height and weight, and HIV/AIDS sexual risk behaviors. Logistic regression models were used to estimate cross-sectional associations. Forty-nine (15%) of the 316 men were classified as obese, and 56 (18%) had unsafe sex in the past three months. Normal weight or overweight men were 3.6 times more likely than obese men to have had unsafe sex, after adjusting for differences in body image and age. Men with better body image were 1.4 times more likely than men with lower body image to have had anal sex, after adjusting for differences in

body weight and age. Non-obese men were no more or less likely than were obese men to have engaged in anal sex or in any sex in the past three months. This is the first study showing a positive relationship between below-obese body weight and unsafe sex and between better body image and anal sex in men who have sex with men. Future research should investigate these novel findings, perhaps using other study designs and data collection tools with less measurement error. Advances in knowledge about HIV/AIDS risk factors, including body weight and body image, could potentially contribute to more effective approaches to reducing this risk.

Keywords Body mass index · Obesity · Body image · Unsafe sex · Anal sex · Homosexual men · HIV prevention

Introduction

American society places a strong emphasis on physical appearance. This is particularly evident in gay culture and media representations of men who have sex with men (MSM). In a study of 59 gay men, Siever (1994) concluded that the gay male subculture imposes strong pressures on men to be physically attractive. Yager, Kurtzman, Landsverk, and Wiesmeier (1988) found that, compared to heterosexual men, gay men reported greater past or present fears of becoming fat, were more likely to feel fat, and scored higher on several measures assessing eating disturbances. Similarly, Gettelman and Thompson (1993) reported that gay men had greater body image disturbance and a higher incidence of eating disorders than heterosexual men. A recent meta-analysis of 27 studies indicated that gay men were more prone than heterosexual men to body dissatisfaction (Morrison, Morrison, & Sager, 2004).

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For many MSM, body dissatisfaction and weight-related concerns are serious challenges. But could these challenges be related, directly or indirectly, to risky sexual behaviors among MSM? How might body image and physical size affect an individual's sexual behaviors, specifically HIV risk behaviors? It is known that the stigma associated with overweight and obesity negatively impacts emotional well-being and may contribute to depression (National Institutes of Health, 2004). Depression, in turn, is one of numerous psychosocial co-factors of HIV risk in MSM (for reviews, see Coates et al., 1996; Kelly, Sikkema, & Winnett, 1995; Ross & Kelly, 1999; Stryker & Coates, 1997). Yet, obesity, measured by body mass index (BMI) and body image have not been widely studied as contributors to HIV risk.

Two studies of MSM focused on the impact of physical appearance and body image on HIV risk behaviors. Lewis and Ross (1995) interviewed 63 gay men attending an inner-city dance party in Sydney, Australia and found that they were more likely to engage in risk-taking sexual behavior (drug use and anal sex without a condom) with a good-looking man. It was postulated that an emphasis on body building and presenting the "perfect" body within the gay male culture was an attempt by the HIV positive man to "magically" insulate himself from the HIV virus and simultaneously indicate to potential sexual partners that he is not infected with HIV/AIDS. Beren, Hayden, Wilfley, and Grilo (1996) found a positive relationship between negative body image and low self-esteem in gay men. This finding has relevance to HIV prevention, in that low self-esteem was identified as a major contributory factor to increased risk of HIV infection (Paul, Stall, & Davis, 1993).

Most prior research on the relationship between BMI or body image and sexual behavior has been conducted with heterosexual women (Thompson, Heinberg, & Tantleff-Dunn, 1999). Moreover, much of this work has measured sexual activity in general and not necessarily HIV sexual risk behaviors. Findings in this area are largely consistent, with most studies reporting an association between positive body image and higher levels of sexual activity in heterosexual women (Faith & Schare, 1993; Trapnell, Meston, & Gorzalka, 1997; Werlinger, King, Clark, Pera, & Wincze, 1997). Wiederman and Hurst (1998) did not observe this association in their sample of 192 mostly white, female college students; however, they did report that a higher BMI was negatively related to being in a relationship, having experienced sexual intercourse, and receiving (but not giving) oral sex. After examining several other variables, they concluded that a "relative lack of opportunity for heterosexual interaction because of less interest by potential partners may be the primary reason behind most of the relationships between BMI and dating and sexual experience" (p. 278), rather than differential sexual attitudes or inhibition due to self-consciousness on the part of larger women.

Three studies have examined the relationship between body image or BMI and sexual risk-taking behaviors in female adolescents or adults. These studies used very different samples and had contradictory findings. Wingood, DiClemente, Harrington, and Davies (2002) found that African American adolescents who were more dissatisfied with their body image were more likely to report never using condoms in the past 30 days and more likely to engage in unprotected vaginal sex in the prior six months. Untiedt (2003) found no relationship between BMI, body image, and six measures of unsafe sexual behaviors in a sample of 285 low income African American and Caucasian women. Zamboni, Robinson, and Bockting (in press) also found no relationship between body image and unprotected vaginal and anal intercourse in a sample of 136 bisexual women.

In summary, a limited set of findings suggests that obesity and poor body image, which are important factors in gay male culture, may be associated, either positively or negatively, with HIV risk. In this study, we aimed to examine, in a community sample of MSM, the relationship among BMI, body image, and a contextualized measure of unsafe sex: insertive or receptive anal intercourse without a condom, outside of a seroconcordant, monogamous relationship. Our empirical work was guided by the Sexual Health Model (Robinson, Bockting, Rosser, Miner, & Coleman, 2002), a conceptual framework which we developed to more adequately address the broader context in which long-term sexual HIV risk occurs. The model was anchored in a holistic definition of sexual health, positing ten key components of sexual health. As such, it more fully integrates the many sexual, relational, emotional, and mental health variables (including body image) considered to be essential aspects of healthy human sexuality. In previous work, we have investigated the importance of specific components of the Sexual Health Model (e.g., culture, sexual anatomy and functioning, sexual health care, challenges, masturbation and fantasy, positive sexuality, etc.) in a variety of populations (Bockting, Robinson, Forberg, & Scheltema, 2005; Miner, Robinson, Hoffman, Albright, & Bockting, 2002; Robinson, Bockting, & Harrell, 2002; Robinson, Scheltema, & Cherry, 2005; Robinson, Uhl et al., 2002; Ross et al., 2001; Untiedt, 2003; Zamboni, Robinson, & Bockting, in press).

This study represents an extension of our empirical testing of the Sexual Health Model as it applies to MSM, their body image, and unsafe sexual practices. Our main hypothesis was: (1) controlling for age, MSM who had a lower BMI (non-obese) and who had a better body image were more likely to engage in unsafe sex in the last 3 months. We controlled for age because age has been shown repeatedly to impact behaviors such as number of sex partners, passive and active oral and anal sex, frequency of sex, likelihood to get tested for HIV, and condom use (Laumann, Gagnon, Michael, & Michaels, 1994; Laumann & Michael, 2001). We had two

additional hypotheses designed to clarify the first hypothesis and investigate whether MSM who were not obese were more likely to engage in unsafe sex simply because they were engaging in more sexual activity in general. These additional hypotheses were: (2) controlling for age, MSM who had a lower BMI (non-obese) and who had a better body image were more likely to engage in anal sex in the last 3 months; and (3) controlling for age, MSM who had a lower BMI (non-obese) and who had a better body image were more likely to engage in sex with anyone, male or female, in the last 3 months.

Method

Participants

Participants were 316 MSM who in 1997–1998 were enrolled in a randomized controlled trial to evaluate the Man-to-Man Sexual Health Seminars, an innovative sexual health intervention for MSM (Rosser et al., 2002). Printed advertisements invited participants to join the “500 Men’s Study” conducted at the University of Minnesota by licensed psychologists with a specialization in human sexuality. The trial was advertised as an opportunity for MSM to explore issues of intimacy between men. Participants were recruited from a variety of sources, principally newspapers, word of mouth, and festivals or events targeting the gay, lesbian, bisexual, and transgender community in the metropolitan area of Minneapolis-St. Paul, Minnesota. To be included in the 500 Men’s Study, potential participants had to self-identify as men who have sex with or are attracted to men; be willing to participate in a seminar on sexuality and intimacy between men; be 18 years of age or older; and be available on one of the five seminar weekends. Most participants pre-registered by providing a name (real or alias) and contact address. Study registrants signed a consent form approved by the University of Minnesota Institutional Review Board. Participants were randomly assigned to either a two-day comprehensive sexual health promotion seminar or a three-hour session of six HIV prevention videos. Additional information about the 500 Men’s Study can be obtained from Ross et al. (2001) and Rosser et al. (2002).

The 316 men included in this analysis were chosen from all 422 trial participants who in 1997–1998 completed a “pre-seminar” questionnaire (i.e., completed before they experienced either the Man-to-Man Sexual Health Seminar or the video program for control participants). We excluded men ($n = 106$) who did not answer whether they had had anal sex in the last 3 months or did not give their height and weight. No statistically significant differences were found between the excluded and included groups by BMI, unsafe sex, anal sex, or HIV status. A larger percentage

(32%) of the excluded men reported being in a primary sexual relationship, compared to 17% of the included men ($p = .002$).

Characteristics of our sample of 316 MSM are provided in Table 1, drawn from their responses to items on the pre-seminar questionnaire. Participants ranged in age from 18 to 72 years old. They were predominantly Caucasian (89%) and well educated (63% had at least a college degree, and 92% had some education past high school).

Measures

The pre-seminar questionnaire was developed to assess participants’ sexual health and their HIV-related knowledge, attitudes, and behaviors. Results were used as a baseline for assessing the effectiveness of the Man-to-Man Sexual Health intervention and to provide additional cross-sectional data on a variety of health issues relevant to this population, including obesity and body image. Whenever possible, items and scales were derived from previously established measures. The entire questionnaire took approximately 30 minutes to complete. The following specific measures from the questionnaire were utilized in this study.

Body image

Participants completed the Body Image subscale from the DeRogatis Sexual Functioning Inventory (DeRogatis & Melisaratos, 1979). This inventory assesses participants’ overall sexual functioning and satisfaction. The 15-item Body Image subscale is one of eight subscales in the inventory; it assesses participants’ sense of self-attractiveness and body acceptability. Example items from the subscale are: “I enjoy being seen in a bathing suit,” and “I have a well-proportioned body.” Each item was rated on a 5-point response scale ranging from 0 (not at all) to 4 (extremely). The possible range of scores was 0 to 60, with a higher score indicating better body image. Evidence of item homogeneity for the Body Image subscale includes a Cronbach alpha of .58 for the DeRogatis sample of 167 men (76 normal and 91 sexually dysfunctional male graduate school students) and an alpha of .81 for our sample of 316 MSM.

Obesity

Obesity was calculated from participants’ written answers to the questions, “What is your height in inches?” and “What is your weight in pounds?” Participants’ height and weight were converted into the body mass index (BMI) or Quetelet’s index (Garrow & Webster, 1985). This index is

Table 1 Description of the study sample (*N* = 316)

Characteristic	Descriptive data	
	<i>n</i>	%
Age in years		
18–24	38	12
25–34	96	30
35–44	105	33
45–72	77	24
Race and ethnicity		
White, non-Hispanic	280	89
Black, non-Hispanic	12	4
Asian or Pacific Islander	6	2
American Indian or Alaska Native	2	1
Hispanic	6	2
Other	10	3
Highest level of education completed		
High school graduate or less	29	9
Vocational school or some college	90	29
College graduate	110	35
Graduate or professional school	87	28
Weight	<i>M</i>	<i>SD</i>
kg	83	17.3
lbs	183	38.2
Height	<i>M</i>	<i>SD</i>
meters	1.8	.08
inches	70.0	3.1
Body mass index in kg/m ²	25.9	4.99
Body mass index in kg/m ² , by category		
Underweight (<18.5)	2	1
Normal weight (18.5–24.9)	158	50
Overweight (25.0–29.9)	107	34
Obesity (≥ 30.0)	49	15
Body image attractiveness score, by category		
Not at all	0	0
Slightly	17	5
Moderately	90	29
Quite a bit	172	55
Extremely	32	10
Ever had an HIV test or “AIDS test”		
Yes	270	86
No	44	14
Unsure or declined to answer	2	0
Ever been diagnosed with HIV or AIDS		
Yes	25	8
No	288	92
Declined to answer	2	0
Sex frequency in past 3 months with male or female partner		
None	94	30
1 to 3 times	77	24
2 to 3 times per month	44	14
Once per week	34	11
2 to 3 times per week	56	18
Daily	10	3

Table 1 Continued

	<i>n</i>	%
Number of different male sexual partners in past 3 months		
None	72	25
1	63	22
2	32	11
3	34	12
4	19	7
5	18	6
6–12	32	11
13–19	4	1
20–150	12	4
Had anal sex in past 3 months with male or female partner		
Yes	127	40
No	101	32
No, had no sexual partner in last 3 months	88	28
Had anal sex without a condom in past 3 months		
Yes	65	21
No	163	52
No, had no sexual partner in last 3 months	88	28
Had unprotected anal sex in the past 3 months with male or female partner outside of an HIV-seroconcordant, monogamous relationship		
Yes	56	18
No	260	82
In a current primary sexual relationship with male or female partner		
Yes	54	17
No	174	55
No, had no sexual partner in last 3 months	88	28
In a current primary sexual relationship, with male or female partner, that is monogamous		
Yes	21	7
No	207	66
No, had no sexual partner in last 3 months	88	28

an easily obtained and relatively accurate measure of overall adiposity (Gallagher, Heymsfield, Heo, Jebb, & Murgatroyd, 2000; Hubbard, 2000; Wiederman & Hurst, 1998). For this study, we used the cutoff point of BMI ≥ 30.0 kg/m² to define obesity, as recommended by several major U.S. and international panels of experts (Kuczmarski & Flegal, 2000; National Institutes of Health, 1998). Participants with BMI < 30.0 kg/m² were classified as non-obese. We used dichotomous BMI instead of continuous BMI because we did not expect the association with sexual behaviors to be linear over the range of BMI values.

On the basis of BMI (calculated from participants’ self-reported weight and height), 50% of the 316 men were assigned to the normal weight category. Thirty-four percent were overweight, and 15% were obese (see Table 1). Nearly two-thirds of the men regarded their body image as “quite a bit” or “extremely” attractive. Participants with a higher BMI tended to have lower body image scores (Pearson *r* = − 0.45; 95% confidence interval = − 0.36 to − 0.54).

Sexual behaviors

Participants were asked to indicate the sexual behaviors they had participated in over the past three months. These measures, defined below, were based on the literature and used in previous work by several of the authors (Rosser, 1991; Rosser et al., 2002).

1. *Unsafe sexual behavior* was defined as any insertive or receptive anal intercourse in the past 3 months without a condom, outside of a seroconcordant, monogamous relationship. It was coded as a dichotomous variable (1 = unsafe, 0 = safe). This variable measures high-risk behavior in the context of the person's primary relationship. Because some men misinterpret sexual monogamy as emotional rather than physical (Ross & Rosser, 1988), a participant had to describe his relationship as long-term (>6 months duration), define it as "monogamous," and report he had zero or only one sex partner during the preceding 3 months. This contextualized measure of unsafe sexual behavior was one of the primary outcome measures assessed in the randomized, controlled trial of the Man-to-Man Sexual Health Seminars (Rosser et al., 2002).
2. *Anal sex*, with or without a condom, in the past 3 months was coded as a dichotomous variable (1 = yes, 0 = no).
3. *Any type of sex* with any partner, male or female, in the past 3 months was coded as a dichotomous variable (1 = yes, 0 = no).

Over two-thirds of the sample had engaged in sex with someone within the past 3 months, with nearly one-third reporting a sexual frequency of at least once a week (see Table 1). Forty percent reported engaging in anal sex within the past three months. For the sexual risk-taking behaviors assessed, 18% of participants had at least one instance of un-

safe sex (i.e., unprotected anal sex in the past 3 months with a male or female partner outside of an HIV-seroconcordant, monogamous relationship in the past 3 months), and 21% had anal sex without a condom. In addition, 8% of the sample was HIV seropositive.

Data analysis

We investigated whether lower BMI and better body image in MSM were more likely (after controlling for age) to be associated with any of the three sexual behaviors defined above. Separate unconditional logistic regressions were conducted for the bivariate association between each of the independent variables (obesity, body image, age) and each of the three sexual behavior dependent variables. Then, for each dependent variable, a backward stepwise multiple logistic regression of all statistically significant ($p < .05$) variables from the bivariate logistic regressions was conducted. We calculated odds ratios, with 95% confidence limits, to indicate the direction, size, and precision of the associations. For the continuous variables of age in years and body image score in (0–60) points, we chose 10-unit intervals for ease of interpretation of the odds ratios and confidence levels.

Results

In the first group of bivariate regression analyses predicting unsafe sex in the past 3 months (Table 2), there was a statistically significant association between non-obesity (OR = 3.8, $p = .03$) and a higher likelihood of engaging in unsafe sex; the association between unsafe sex and better body image approached significance (OR = 1.4, $p = .07$). Putting these variables into a multiple logistic regression model and thus

Table 2 Estimates of odds ratios and their 95% confidence limits for the relation of non-obese body mass index, body image, and age with three sexual behaviors in bivariate and multivariable logistic regression models

	Bivariate model			Multivariate model		
	OR	95% CI	<i>p</i>	OR	95% CI	<i>p</i>
Unsafe sex						
Non-obesity	3.8	1.14,12.66	.030	3.6	1.08,12.20	.037
Body Image, per 10 points	1.4	0.97,2.02	.070	<i>ns</i>		
Age, per 10 yrs	0.7	0.52,0.93	.016	0.7	0.52,0.95	.022
Anal sex						
Non-obesity	2.0	1.05,4.07	.037	<i>ns</i>		
Body Image, per 10 points	1.4	1.04,1.83	.026	1.4	1.05,1.87	.021
Age, per 10 yrs	0.7	0.52,0.82	.001	0.7	0.53,0.84	.001
Any sex						
Non-obesity	2.0	1.06,3.72	.032	<i>ns</i>		
Body Image, per 10 points	1.6	1.21,2.21	.001	1.6	1.21,2.21	.001
Age, per 10 yrs	0.9	0.76,1.18	<i>ns</i>	Not entered ^a		

^aBivariate logistic regression relation was not statistically significant; thus, no multivariable logistic regression was run for this variable.

controlling for the interrelationships among the three independent variables did not appreciably alter these relationships: non-obesity (OR = 3.6, $p = .037$) and younger age (OR = 0.7, $p = .022$) were significantly related to unsafe sex, but body image was not. Non-obese men were 3.6 times more likely than obese men to have unsafe sex ($p = .037$).

In the second group of bivariate regression analyses predicting anal sex (with or without condoms) in the past 3 months, all three independent variables were significantly associated with a higher likelihood of engaging in anal sex: non-obesity (OR = 2.0, $p = .037$), better body image (OR = 1.4, $p = .026$), and younger age (OR = 0.7, $p = .001$). These relationships were altered, however, when the variables were put into a multiple logistic regression model: body image (OR = 1.4, $p = .021$) and younger age (OR = 0.7, $p = .001$) remained significantly related to anal sex, but non-obesity dropped out of the model. Men who had a better body image and were younger were more likely to engage in anal sex. The odds ratio was 1.4 for a 10-unit increase in this body image scale ($p = .021$).

In the third group of bivariate regression analyses predicting any sex with anyone (male or female) in the past 3 months, non-obesity (OR = 2.0, $p = .032$) and better body image (OR = 1.6, $p = .001$), but not age, were significantly associated with a higher likelihood of engaging in any sex with anyone. In the multiple logistic regression model, only body image remained significantly related to any sex with anyone; non-obesity dropped out of the model. Better body image was associated with an increased likelihood of any sex. The odds ratio was 1.6 for a 10-unit increase in this body image scale ($p = .001$).

Discussion

MSM continue to represent the largest single exposure category of AIDS cases in the U.S. Forty-eight percent of all U.S. AIDS cases through 2003 were identified as being infected through male-to-male sexual contact (National Center for Infectious Diseases, 2003). In our study of 316 MSM sampled from a Minnesota metropolitan community, we found that lower BMI (below the obesity cutoff) was a strong risk factor for unsafe sex, better body image was a weak risk factor for anal sex and any sex, and higher age was a weak protective factor for both unsafe sex and anal sex.

This is the first study showing a positive relationship between lower BMI and unsafe sex, as well as a positive relationship between better body image and increased levels of anal sex and overall sexual activity in MSM. Our results suggest that BMI could be an important factor to consider when designing HIV/STD prevention programs since non-obese men appear to be at greater risk for HIV/AIDS and other STDs due to their, and their partners', increased propensity

to engage in unsafe sex. If our findings are confirmed in future research, HIV prevention programs may want to choose approaches that address different BMI subgroups of MSM—thin and average weight men, obese men or “bears,” and possibly body builders (LeVay & Valente, 2003).

We propose several reasons to explain the positive relationship between non-obesity and unsafe sex. First, it is possible that non-obese MSM were less likely to insist on condom use, perhaps because they felt attractive and had a sense of invulnerability to disease arising out of that feeling of attractiveness and confidence. However, if this were the case, we would expect that this sense of attractiveness and self-confidence would be reflected in a positive relationship between body image and unsafe sex. There was no significant relationship between body image and unsafe sex in our MSM sample after simultaneously controlling for confounding by BMI and age, making this explanation unlikely.

A second possible explanation is that non-obese MSM were more sexually active overall, thus leading to a higher probability of having unsafe sex simply because they were engaging in more sexual activity. However, this explanation was not supported by the remaining logistic regressions which showed that non-obese MSM were no more likely to have engaged in anal sex or any sex in the past three months than obese MSM. Given the strength of the association between non-obese body weight and unsafe sex, the association is unlikely to be undermined by confounding by other measures of sexual behavior.

The most compelling explanation is that the sexual partners of non-obese men were less likely to insist on condom use, either because they believed that thinner and, thus, more attractive MSM were less likely to be infected with an STD or because they were reluctant to insist on safer sex for fear of losing their sexual opportunity with these attractive MSM. This explanation is supported by studies showing that gay men are more likely to engage in sexual risk-taking behavior with a good-looking man and that body building is a way of signaling to potential sexual partners that one is not infected with HIV/AIDS (Lewis & Ross, 1995; Ross & Kelly, 1999).

Healthy body image does not appear to be a risk factor for increased sexual risk-taking, although it was related to increased levels of sexual activity, including anal sex, in our sample. It is not clear if a positive body image makes it more likely that a man would initiate sexual activity (because he has enhanced assertiveness or confidence), receive sexual attention from others (because others may be attracted to his self-confidence or physical attractiveness), or respond affirmatively to sexual interest from others (because he is comfortable with himself). It is likely that all three processes are occurring simultaneously. Although better body image may give MSM increased access to and desire for sexual activities, our findings suggest that safer sex is not necessarily jeopardized.

This positive relationship between better body image and increased sexual activity has been found and discussed in several populations, including women. The concept of spectating (i.e., a negative self-focus on one's body during sex) on the part of the person with low body image has been used to explain why lower body image may interfere with sexual activity (Faith & Schare, 1993; Wiederman, 2000). Trapnell et al. (1997) concluded that motivational factors may best explain body image-related sexual inexperience whereby less confident individuals harbor negative expectations about dating and are then less likely to initiate or respond to sexual opportunities (Wiederman, 2000). Conversely, more confident individuals harbor positive expectations about dating and are then more likely to initiate or respond to sexual opportunities. These hypotheses suggest a mediation process in which one variable (e.g., body image) influences another (e.g., sexual activity) via a third mediating variable (e.g., negative or positive expectations about sex; Wiederman, 1996).

Body image and younger age were significantly related to anal sex in our sample, but non-obesity was not. Perhaps MSM with a better body image have more confidence to seek out sexual partners for anal sex, one of the more intimate and vulnerable sexual activities. It is also possible that younger MSM were more likely to engage in anal sex as part of their experimentation as gay men, with anal sex representing the essence of being gay. In any case, our data indicate that younger men were more likely to engage in both risky sex and anal sex, a finding supported by others (LeVay & Valente, 2003).

The cross-sectional nature of our study limits causal interpretation of our findings. We restricted our analysis to only three independent variables. Study participants were volunteers from one metropolitan area in the United States; results may differ from MSM chosen at random in states or countries with different social or economic characteristics, including racial or ethnic composition, than Minnesota (Minnesota Office of Geographic and Demographic Analysis, 2005).

Measurement error is inherent in self-reports of behavioral risk factors. Participants may underreport unsafe sex, a socially undesirable behavior. However, risky sexual behaviors are more likely to be accurately reported in an anonymous survey, such as the one we used, than in an interview (Finer, Darroch, & Singh, 1999; Turner, Miller, & Rogers, 1997). Studies investigating body image satisfaction among groups of different sexual orientations have produced equivocal findings, leading to a recommendation that researchers should move toward greater measurement consistency (Morrison et al., 2004). In general, both men and women overestimate their height and underestimate their weight (Rowland, 1990; Stewart, Jackson, Ford, & Beaglehole, 1987), which deflates obesity prevalence. This bias may be even greater in MSM samples because of gay male culture norms that stress phys-

ical attractiveness (Gettelman & Thompson, 1993; Siever, 1994; Yager et al., 1988).

Finally, BMI does not distinguish between higher weight-to-height ratios that are due to higher levels of adiposity versus those ratios that are due to higher levels of muscle mass (Hubbard, 2000). The standard BMI categories might not apply as well to a population of MSM, among whom weight lifting and body building are more popular activities than among heterosexual men (Pope, Phillips, & Olivardia, 2000). The trial whose data we analyzed lacked the resources to collect less subjective indicators of adiposity, such as waist to hip ratio, dual-energy X-ray absorptiometry, labeled water dilution, underwater weighing, skin fold thickness, and bioelectrical impedance analysis (Gallagher et al., 2000; Kuczmarski & Flegal, 2000; Laitinen, Power, & Jarvelin, 2001).

In this study, body size and body image were negatively related and appeared to influence unsafe sex, anal sex, and any sex in different ways. Physical attractiveness alone (as reflected in non-obesity) appears to be related to increased sexual risk-taking among MSM. In contrast, while a healthy body image may give MSM increased access and desire for sexual activities, unsafe sex does not necessarily follow. Future research should investigate these intriguing findings. In light of our study's limitations, we encourage re-investigation of these associations in other samples of MSM using different study designs and different methods of assessing risky sex behaviors, body image, and body size.

It would be surprising if obesity, a known risk factor for chronic disease (National Institutes of Health, 2004; Sturm, 2002; U.S. Department of Health and Human Services, 2001; Visscher & Seidell, 2001), was a protective factor against unsafe sex, which can lead to HIV and AIDS. Approximately 40,000 persons in the United States become infected with HIV each year (Karon, Fleming, Steketee, & De Cock, 2001). Of the 422 men who participated in the trial from which our study data were obtained, 14–24% were considered to be at risk of acquiring or transmitting HIV (Rosser et al., 2002). Even a modest advance in knowledge about the behavioral risk factors, including body image and BMI, for having unsafe sex could potentially contribute to more effective approaches to reducing this high risk among MSM.

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