Published in final edited form as:

Arch Sex Behav. 2014 May ; 43(4): 779–788. doi:10.1007/s10508-014-0303-5.

HIV Prevalence and Demographic Determinants of Unprotected Anal Sex and HIV Testing Among Men Who Have Sex with Men in Beirut, Lebanon

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Abstract

The limited epidemiological data in Lebanon suggest that HIV incident cases are predominantly among men who have sex with men (MSM). We assessed the prevalence of HIV and demographic correlates of condom use and HIV testing among MSM in Beirut. Respondent-driven sampling was used to recruit 213 participants for completion of a behavioral survey and an optional free rapid HIV test. Multivariate regression analysis was used to examine demographic correlates of unprotected anal sex and any history of HIV testing. Nearly half (47%) were under age 25 years and 67% self-identified as gay. Nearly two-thirds (64%) reported any unprotected anal intercourse (UAI) with men in the prior 3 months, including 23% who had unprotected anal intercourse with men whose HIV status was positive or unknown (UAIPU) to the participant. Three men (1.5% of 198 participants tested) were HIV-positive; 62% had any history of HIV testing prior to the study and testing was less common among those engaging in UAIPU compared to others (33% vs. 71%). In regression analysis, men in a relationship had higher odds of having UAI but lower odds of UAIPU and any university education was associated with having UAI; those with any prior history of HIV testing were more likely to be in a relationship and have any university education. HIV prevention efforts for MSM need to account for the influence of relationship dynamics and promotion of testing needs to target high-risk MSM.

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Keywords

HIV testing; men who have sex with men (MSM); social determinants; unprotected anal intercourse (UAI); Lebanon

INTRODUCTION

Over half a million people are living with HIV in the Middle East and North Africa (MENA), including over 3,500 in Lebanon where HIV is mostly concentrated among marginalized groups, including men who have sex with men (MSM) (Mumtaz et al., 2011; UNAIDS, 2013). Compared to the general population rate of less than .01% (UNAIDS, 2013), HIV prevalence among MSM in Lebanon has been estimated at 3.7% (Mahfoud et al., 2010) and higher rates of 5–10% are estimated among MSM in other countries within the region, such as Egypt and Sudan (Elrashied, 2006; Family Health International & Ministry of Health Egypt, 2006; Mumtaz et al., 2011). Several studies of HIV risk behavior among MSM have been conducted in MENA (Mumtaz et al., 2011), with findings consistently showing high rates of unprotected anal sex (El-Sayyed, Kabbash, & El-Gueniedy, 2008), including a few studies in Lebanon which revealed that about 60% of MSM do not consistently use condoms (Mahfoud et al., 2010; Nakib & Hermez, 2002; UNAIDS, 2008). However, these studies have focused mostly on assessing prevalence rates of HIV infection and risk behaviors, rather than identification of associated characteristics that could inform the development of HIV prevention initiatives. The MSM population in Lebanon is heterogeneous, with self-affirmed gay or bisexual men, sex workers, and heterosexually identified men who may or may not be in relationships with women. Men who have sex with men and women (MSMW) may also represent a potential bridge to growing infections among the general population; studies of men who have sex with men in the region suggest that as many as 30–80% of those studied are MSMW (El-Sayyed et al., 2008; Jordan National AIDS Program, 2010; Mellouk et al., 2012; Valadez et al., 2013). One study of MSM in Beirut found that 38% of participants reported transactional sex (Mahfoud et al., 2010); studies of MSM elsewhere in the region have found rates of transactional sex in the range of 20–76% (Abu-Raddad et al., 2010; Mumtaz et al., 2011).

HIV testing can be instrumental to increasing condom use, particularly among those who are infected (Marks, Crepaz, Senterfitt, & Janssen, 2005); yet, the testing rate is thought to be as low as 25% among MSM in Lebanon (Mahfoud et al., 2010) and 15% in other parts of MENA (Adam et al., 2009; UNAIDS, 2008). HIV testing is stigmatized in MENA as it connotes fear of infection and having engaged in inappropriate behavior that warrants the punishment of HIV (Newcomb & Mustanski, 2011). For MSM, additional barriers to HIV testing include traditional masculinity and not seeking health services, internalized homophobia, and fear of confidentiality breaches (Remien et al., 2009).

Using respondent-driven sampling, we surveyed and used rapid tests with MSM in Beirut to examine the prevalence of HIV infection and other sexually transmitted infections, as well as the prevalence and demographic determinants of HIV sexual risk behavior and HIV testing.

METHOD

Participants

Standard respondent-driven sampling (RDS) methodology was used to recruit the sample between May and December of 2012. RDS is an adaptation of chain-referral sampling as it relies on members of the study population to identify participants and it is considered an effective methodology for reaching hidden populations (Salganik & Heckathorn, 2004). Eligibility criteria consisted of being biologically male and male-identified, age 18 years or older, fluent in English or Arabic, residing in greater Beirut, and having had oral or anal sex with a man in the past 12 months.

A sample of 213 men enrolled in the study, including the 7 seeds. Table 1 shows the demographic and sexual behavior characteristics of the sample. Nearly half (47%) of the sample was under age 25 years, two-thirds (67%) self-identified as gay, and most were employed (72%) and had some university education (65%). Most were born in Lebanon (70%), but the recruitment chains tapped into refugees from Iraq ($N = 37$; 17%) and Syria ($N = 11$; 5%), many of whom lived with networks of other MSM refugees from their home country. Similar proportions of the sample were Muslim (32%) or Christian (35%); the remaining third were mostly atheist or having no formal religious affiliation. Ninety-one participants (43%) reported currently being in a committed relationship, with 79 having a male primary partner and 12 a female partner [including one partner who was transgendered (male to female)].

Procedures

Recruitment began with 7 persons designated as “seeds,” who were identified through recommendations from community organizations working with MSM and study consultants. All participants, including seeds, received four recruitment coupons to recruit members of their social network, resulting in multiple waves of participants. Participants were instructed to give a coupon to eligible MSM peers who were interested in participating and to inform the recruit to call the study coordinator for coupon verification, eligibility screening, verbal consent procedures, and scheduling of an interview. The coupons were uniquely coded to link participants to their survey responses and for monitoring who recruited whom and reimbursement of participants for recruitment of peers.

The interview was administered at one of the collaborating community organizations or a neutral location preferred by the participant, by either an MSM or female interviewer, depending on the preference of the participant. Participants were given \$30 for completing the interview and were told that they would receive \$10 for each peer recruit (up to four) who enrolled in the study; hence, a total of up to \$70 could be earned by each participant. Participants were asked to contact the study coordinator periodically to ascertain whether any of their recruits had enrolled and completed the survey so that they could then schedule a time to collect their compensation.

After the interview, free optional finger-prick rapid tests were offered for HIV, hepatitis B (HBV), and syphilis, along with pre- and post-test counseling from the trained interviewer. These HIV rapid tests have been shown to have greater than 99% sensitivity and specificity

rates (Health Resources and Services Administration HIV/AIDS Bureau, 2011); however, with regard to the HIV test, infections that occurred within 6 weeks prior to the test may result in a false negative result. If any of the tests was positive, the participant was given a referral for a free confirmatory test at a nearby hospital laboratory, which sent the result to the community organization where the interview was completed. The participant returned for the result, counseling and a referral for medical treatment, if warranted.

Measures

The survey was administered in English or Arabic, depending on the preference of the participant, with computer-assisted interview software. The survey was developed in English and translated into Arabic using standard translation and back translation methods. Participants were given the option of completing the survey on their own or having the interviewer administer the survey; no statistics were collected, but the study interviewers reported that it was very rare (less than 5%) for a participant to choose to self-administer the survey.

Demographics—These consisted of age, education level, current attendance at school or university, employment, monthly income, religious affiliation, country of birth, refugee status, sexual orientation, and relationship status. To assess size of network of MSM peers, participants were also asked, “Approximately how many men who have sex with men do you know personally who live in greater Beirut and are age 18 or above? These should be men who you know by name and that you have contact with either by phone, e-mail or face-to-face.”

Sexual partners—For both male and female sex partners, the participant was asked to indicate the number of sex partners in the past 3 months and the number of partners of each of three partner types: lover or primary partner (man/woman with whom you felt emotionally involved in a committed relationship); one-night stand or “hook-up” (man/woman with whom you had sex only once and had no emotional attachment to); and “other” partners (man/woman with whom you had sex, but who was neither your lover nor one-night stand, such as a “fuck-buddy” or “friend with benefits”). To assess transactional sex, participants were also asked if they had sex partners who provided them with money, gifts or other things in exchange for sex, or to whom they gave such things in exchange for sex, in separate items.

Sexual behavior—For receptive and insertive anal intercourse with men, and vaginal and anal intercourse with women, participants were asked how many times they engaged in the act over the past 3 months, how many of those acts involved the use of a condom, and the HIV status of the partners with whom unprotected (no condom used) acts were engaged with. To assess partner HIV status, participants were asked to indicate how many of these partners “told you he/she was HIV negative and you had no reason to doubt it,” “you knew this man/woman was HIV positive,” and “you were not completely sure of this man/woman’s HIV status.”

Participants who reported anal sex with men in the past 3 months were also asked about their last anal sex encounter with a male. Regarding this encounter, participants were asked to indicate the type of partner, how they met the partner, the HIV status of the partner, whether or not they engaged in receptive and insertive anal sex, and whether or not a condom was used during each of these types of acts.

Communication with partners about HIV status and risk—Participants were asked to rate their level of agreement from 1 (strongly agree) to 5 (strongly disagree) with regard to the following statements: “I always talk to my sex partners about HIV status and risk before having sex with them” and “If a partner tells me he is HIV negative, I always ask when he was last tested.”

History of HIV testing and sexually transmitted infections (STIs)—Participants were asked whether or not they had ever tested for HIV. Those who had tested were then asked if they had tested within the past 12 months and the result of their last test. Participants were read a list of 12 common STIs and asked if they had ever had the infection in their lifetime.

Data Analysis

When using RDS for recruitment, statistical weights can be calculated to generate representative estimates of the primary outcomes. However, we opted to only use unadjusted (raw data) estimates in our analysis because of evidence suggesting that the weighted estimates were not reliable. Firstly, our data revealed that recruitment rates for those who did and did not engage in unprotected anal sex were similar, despite the two groups having pronounced differences in average network size. Under the standard RDS assumption that recruitment probability is proportional to degree, we would expect the group with the higher mean degree to be recruited more rapidly (Berchenko, Rosenblatt, & Frost, 2013). As the recruitment rate was not different between the groups, weighting by the inverse of network size may lead to spurious results. We also observed very high (greater than ± 0.7) homophily (i.e., the tendency of participants to recruit individuals with similar characteristics) with regard to some sample characteristics (e.g., nationality, sexual identity, sex with women), which have been shown to be problematic for generating reliable population estimates (Iguchi et al., 2009).

For analysis, response categories were combined to create binary indicators for measures of education (at least some university education), monthly income ($> \$1000$ USD; note that U.S. dollars is a regular currency in Lebanon), and sexual orientation (self-identify as gay). Bivariate statistics were used to examine correlates of unprotected anal sex with men regardless of partner HIV status, unprotected anal sex with male partners of unknown or positive HIV status, and any history of HIV testing. Statistical significance was represented by p values $< .05$, while marginal significance was represented by p values between .06 and .10.

Logistic regression analysis was used to examine demographic correlates of these three variables, which served as the dependent variables, in separate models. The demographic variables that were entered into the models as independent variables included age and the

binary indicators of employment, any university education, monthly income, gay self-identity, refugee status, and being in a committed relationship. In addition, to account for the correlations in the data created by the high homophily described above plus any biases that may be generated by the recruitment process (Abramovitz et al., 2009), we included characteristics of the person who recruited the participant (age and binary indicators of gay self-identification, born in Lebanon, high income, and recent sex with women) as covariates in the models. For the bivariate and multivariate data, the two unprotected anal sex variables were calculated using the entire sample as the denominator, with the 20 participants who did not report anal sex with men in the past 3 months being classified as not having unprotected anal sex. We repeated these analyses with data only from the men who reported anal sex and in each analysis the results produced the same significant associations; hence, we chose not to present these data.

RESULTS

Sexual Partners Over the Past 3 Months

All but 9 men ($N = 204$; 96%) reported having any type of sex with a man in the past 3 months and, among those who had sex with men, the median number of sex partners was 2 ($M = 4.4$; $SD = 7.9$). Half ($N = 104$; 51%) of the sexually active men reported that at least one of their sex partners over the past 3 months was a primary partner with whom they felt emotionally involved and committed to; this group included the 79 men in a committed relationship with another man, of whom 62 (78%) reported that their partner had been their only sex partner over the past 3 months. Nearly half ($N = 100$; 49%) reported at least one “hook-up” or “one night stand” and 45% ($N = 91$) described having at least one “other” type of sex partner in the past 3 months. Thirty-three (16%) men reported transactional sex with men in the past 3 months, in which they received money or gifts in exchange for sex, while 13 (6%) men described providing money or gifts in exchange for sex.

Thirty-two men (15%) reported having sex with a woman in the past 3 months, most ($N = 19$) of whom were refugees from either Syria or Iraq. Of these 32, 9 were currently in a committed relationship with a woman and 7 reported transactional sex in which their female partner provided them with money or gifts in exchange for sex (4 of these 7 men had engaged in transactional sex with men as well).

Sexual Behavior with Men

A total of 193 men (91%) reported having anal intercourse with men in the past 3 months, including 118 (55%) who had receptive anal sex and 140 (66%) who had insertive anal sex (65 men engaged in both insertive and receptive). Among the 118 who had receptive anal sex, the mean number of such sex acts over the past 3 months was 12.8, of which an average of 56% were unprotected (i.e., no condom used); however, the distribution of percent of receptive anal sex acts that were unprotected was largely bimodal, with 68% reporting either never using condoms (44%) or always using condoms (24%). Of the 118 men, 90 (76%) reported any unprotected receptive anal sex in the past 3 months, of whom 28 (31%) indicated that at least one unprotected encounter was with a partner of unknown HIV status (none reported such sex with a partner known to be HIV positive).

Among the 140 who had insertive anal sex, the mean number of such sex acts over the past 3 months was 9.6, of which an average of 48% were unprotected; however, similar to receptive anal sex, most men (74%) either reported always using condoms (38%) or never using condoms (36%). A total of 87 men (62%) reported any unprotected insertive anal sex in the past 3 months, of whom 28 (32%) indicated that at least one unprotected encounter was with a partner whose HIV status was positive ($N = 1$) or unknown ($N = 27$). Considering both receptive and insertive anal sex, 136 (70%) of the 193 men who had anal sex (or 64% of the whole sample) reported any unprotected anal sex within the past 3 months, of whom 49 (36% of those who had anal sex; 23% of the whole sample) had unprotected sex with an HIV-positive or unknown status partner.

Participants who reported any anal sex with a man over the past 3 months ($N = 193$) were asked about their last anal sex encounter with a man. This latest encounter involved one partner in most (83%) cases. A total of 78 (40%) men indicated that this latest encounter involved their primary partner, while the others reported that the sex partner(s) included men they knew casually or were dating ($N = 61$; 32%) or one night stands ($N = 60$; 31%). Eighty men (41%) reported not to know the HIV status of the partner, and only one participant indicated that this partner was HIV-positive; all others indicated that the partner(s) told them they were HIV-negative. Common venues for meeting their last sexual partner were the internet (41%), bar or club (26%), and at a private party or through friends (14%). The last anal sex encounter involved receptive anal sex for 97 of the men, of whom only 28 (29%) reported using a condom. Of the 117 participants who reported insertive anal sex, 55 (47%) reported using a condom. A total of 116 men (60% of 193) reported either unprotected insertive or receptive anal sex during their last anal sex encounter.

Sexual Behavior with Women

Of the 32 men who had female sex partners in the past 3 months, 31 reported having vaginal intercourse and 16 (50%) had anal intercourse with these partners. Among those who had vaginal sex, the mean number of occasions was 22.7 ($SD = 32.3$); an average of 46% of these occasions were unprotected, but most reported either always ($N = 15/31$; 48%) or never ($N = 10/31$; 32%) using condoms. Overall, 16 (52%) men reported having any unprotected vaginal intercourse, and 8 indicated that at least one unprotected encounter was with a partner of unknown HIV status. Among the 16 who had anal sex, the mean number of occasions was 5.8 ($SD = 7.2$); an average of 19% of these occasions were unprotected, with 3 men (19%) reporting to never use a condom and the other 13 reporting they always used a condom during anal sex with female partners over the past 3 months. Two of the three men who had unprotected anal sex reported that at least one of these partners was of unknown HIV status.

Of the 32 men who had vaginal or anal intercourse with women in the past 3 months, 23 also had anal sex with men during this time period. In this subgroup of 23 men, 5 (22%) reported unprotected intercourse with both male and female partners whereas 5 reported unprotected sex only with men, and 6 reported unprotected sex only with women.

Communication about HIV Status and Risk

Less than one-quarter (23%) reported to agree strongly or somewhat with declarations of always talking to sex partners about HIV status and risk prior to sex and 35% reported this level of agreement with the declaration of asking partners when they were last tested if they claimed to be HIV-negative. Men who reported unprotected anal sex with men of unknown or positive HIV status were less likely to agree with the statement regarding discussion of HIV status and risk prior to sex (10% vs. 26%; $p = .02$), as well as asking their partner when they last tested if they claimed to be HIV negative (20% vs. 40%; $p = .01$), compared to the rest of the sample; these associations were also significant with regard to unprotected anal sex regardless of the HIV status of the partner (see Table 2).

HIV and Other Sexually Transmitted Infections

Less than two-thirds ($N = 132$; 62%) self-reported ever testing for HIV, and 42% ($N = 90$) had tested within the past 12 months. One participant self-reported being HIV-positive and thus was not administered the rapid HIV antibody test; 197 of the remaining 212 participants agreed to be tested for HIV (as well as HBV and syphilis) following the completion of the survey, of whom two tested positive (one of which was confirmed; the other opted against taking the referral for a confirmatory test). Hence, a total of 3 (1.5%) participants were considered to be HIV-positive out of the 198 who either self-reported being HIV-positive or who were tested as part of study procedures. Of the 197 participants who received a rapid test for HBV and syphilis, 2 tested positive for HBV and 3 for syphilis. In the survey, 104 (49%) participants reported ever having had a specific sexually transmitted infection, with the most common being genital lice (33%), gonorrhea (27%), chlamydia (19%), genital warts (14%), and human papilloma virus (9%).

Associations between Sexual Risk Behaviors With Men, STI History, and HIV Testing

Men who had unprotected anal sex with partners of unknown or positive HIV status were much less likely to have ever tested for HIV compared to the rest of the sample (33% vs. 71%; $p < .001$), but there was no association between HIV testing and unprotected anal sex when partner HIV status was not taken into consideration (see Table 2). Men engaged in unprotected anal sex regardless of partner HIV status (77% vs. 46%; $p < .001$), and with partners of unknown or positive HIV status (80% vs. 61%; $p < .05$) were more likely to self-report any history of having an STI compared to the rest of the sample (see Table 2). History of an STI was not associated with ever having been HIV tested.

Demographic Correlates of Unprotected Anal Sex and HIV Testing

In bivariate analysis, when partner HIV status was not accounted for, men who had any unprotected anal sex were more likely to be younger (mean age = 25.3 vs. 27.8; $p < .05$), to have at least some university education (75% vs. 48%; $p < .001$), self-identify as gay (76% vs. 49%; $p < .001$), and to have engaged in transactional sex (25.7% vs. 10.4%; $p < .01$) (see Table 2). The subgroup of refugees from Syria and Iraq were less likely to have engaged in unprotected anal intercourse (48%) compared to the rest of the sample (69%) ($p < .01$). Men who had unprotected anal sex with positive or unknown status partners were more likely to have had transactional sex (51.0% vs. 11.0%; $p < .001$) and less likely to earn a monthly

income of at least \$1000 USD compared to the rest of the sample (16% vs. 33%; $p < .05$); no significant associations were found with the other demographic variables.

Interestingly, the direction of the association between relationship status and unprotected anal sex differed depending on whether partner HIV status was accounted for: when not considering knowledge of partner HIV status, men who had any unprotected anal sex were almost twice as likely to be in a committed relationship compared to the rest of the sample (52% vs. 27%; $p < .001$), whereas men who had unprotected anal sex with partners of positive or unknown HIV status were much less likely to be in a committed relationship (16% vs. 51%; $p < .001$) (see Table 2).

In logistic regression analysis, having at least some university education (O.R. [95% C.I.] = 2.79 [1.27, 6.13]) and being in a committed relationship (O.R. [95% C.I.] = 2.81 [1.38, 5.72]) were associated with having nearly thrice the odds of having any unprotected anal sex with men when partner HIV status was not accounted for (see Table 3). In the model predicting unprotected anal sex with partners of positive or unknown HIV status, only relationship status was a significant correlate; men in a committed relationship were 85% less likely to engage in unprotected anal sex with unknown status partners compared to the rest of the sample (O.R. [95% C.I.] = 0.15 [0.06, 0.38]).

With regard to HIV testing, those who had ever tested were more likely to have some university education (76% vs. 48%; $p < .001$), to have monthly income of at least \$1000 USD (39% vs. 14%; $p < .001$), self-identify as gay (74% vs. 53%; $p < .01$), and to be in a committed relationship (54% vs. 25%; $p < .001$), but less likely to report transactional sex (15.2% vs. 28.4%; $p < .05$) in bivariate analysis (see Table 2). The refugees from Syria and Iraq were less likely to have ever been tested for HIV (46% vs. 67%; $p < .01$) compared to the rest of the sample. In the logistic regression model, having any university education [O.R. (95% C.I.) = 2.32 (1.07, 5.04)] and being in a committed relationship (O.R. [95% C.I.] = 4.26 [2.07, 8.80]) were associated with two and four times the odds, respectively, of having ever tested for HIV (see Table 3); monthly income greater than \$1000 USD was marginally associated with higher odds of ever having been tested (O.R. [95% C.I.] = 2.50 [0.99, 6.30]).

DISCUSSION

In this sample of mostly young, educated, gay-identified MSM in Beirut, HIV prevalence was lower than estimated in other studies (Mahfoud et al., 2010), but consistent with other research in MENA (El-Sayyed et al., 2008; Mahfoud et al., 2010; Nakib & Hermez, 2002; UNAIDS, 2008), we observed a predominance of unprotected insertive and receptive anal sex. Our data revealed much higher rates of HIV testing compared to other studies of MSM in the region (Adam et al., 2009; Mahfoud et al., 2010; UNAIDS, 2008); unfortunately, those at most risk for HIV were least likely to have been tested.

Three men in the sample were HIV-positive, which translates into a slightly lower prevalence rate (1.5%) compared to the estimated population prevalence of 3.6% found in the only previous RDS study of MSM in Beirut (Mahfoud et al., 2010). The estimate from

this previous study was based on one infection in a sample of 103 men, 38% of whom had engaged in transactional sex and use of RDS weighting. It can be argued that neither our study nor the prior study can be considered representative of most MSM in Beirut and that additional epidemiological data are needed to better gauge the true HIV prevalence in the population. Our study interviewers reported anecdotal impressions based on discussions with participants and friends in the community that some individuals who were engaging in high-risk behaviors or who were HIV-infected were opting not to participate because they wanted to avoid discussing HIV risk or being HIV-tested in a study setting. The interviewers also observed that the participants who refused the HIV test tended to report high-risk behaviors in the survey and seemed to be uncomfortable when it came time to considering the HIV test, perhaps from fear of testing HIV-positive. While purely conjecture, these impressions have implications for potential selection bias and suggest that our data may underestimate the rate of high-risk sexual activity and prevalence of HIV and other STIs in the study population.

Over 60% of the sample had tested for HIV in their lifetime, including over 40% who had tested within the past 12 months, which are much higher rates than estimates reported in other studies of MSM in Lebanon (Mahfoud et al., 2010) and MENA (Adam et al., 2009; UNAIDS, 2008). This may reflect the success of campaigns led by community organizations and Lebanon's National AIDS Program to promote HIV testing through the use of social media (e.g., Facebook) and television advertisements. However, the participants at greatest risk for HIV--those engaging in unprotected anal sex with partners of unknown HIV status, and transactional sex, and those with a history of having an STI--were all less likely to have ever tested for HIV, highlighting a focal point for future HIV prevention efforts.

Consistent with or slightly higher than rates reported in other studies of MSM in MENA (El-Sayyed et al., 2008; Mumtaz et al., 2011; Nakib & Hermez, 2002; UNAIDS, 2008), we found that about two-thirds of the sample had any unprotected anal sex and condoms were not used in about half of all anal sex acts, regardless of whether sex involved receptive or insertive anal intercourse. To assess the risk level associated with unprotected sex, it is important to consider the HIV status of the sex partner(s). Among the men who reported unprotected anal sex, approximately a third indicated that they did not know the HIV status of the partner with whom they had unprotected sex with while the others indicated that these sex partners had told them they were HIV-negative (only one participant reported having unprotected anal sex with a partner they knew to be HIV-positive). Having a sex partner say they are HIV-negative does not remove all possibilities of HIV risk and a minority of the sample indicated asking such partners about the date of their last test. Furthermore, less than a quarter of the sample reported discussing HIV status and risk with partners prior to sex. HIV prevention efforts need to focus on understanding and overcoming barriers to more effective communication between partners about HIV status and risk prior to making decisions about condom use.

MSMW are often thought of as potential bridges for HIV transmission to spread from marginalized high-risk groups to the general population, particularly in settings where homosexuality is highly stigmatized. Other studies of MSM in MENA have suggested that over 30% of study samples are MSMW (El-Sayyed et al., 2008); our study revealed that a

relatively small proportion of the sample (15%) had recent sex with both men and women, perhaps because the majority of the sample was gay-identified, and stigma may have caused some bisexual and heterosexually identified men to be reluctant to participate. Interestingly, only half of these men reported always using condoms during vaginal sex, but the vast majority reported always using condoms during anal sex with female partners. We did not assess whether their female partners were aware that the participant had sex with men, and our qualitative research suggested that MSMW who are less comfortable with their sexuality are often fearful of their female partners becoming aware of their sex with men (Wagner et al., 2012). With anal sex often being associated with sex between men, it is possible that when MSMW have anal sex with women there may be a greater likelihood of the woman being aware of the man's bisexuality and a mutual recognition of greater risk and need for condom use. In contrast, vaginal intercourse does not have the same connotation and not using condoms may still be normative, resulting in men being fearful that suggesting the use of a condom may lead the female partner to suspect that the man may also have sex with men. Alternatively, this finding could be explained by men viewing anal intercourse as more risky for HIV/STI transmission (for themselves and/or their partner) than vaginal intercourse.

Relationship status was the demographic that stood out among those examined in association to both condom use and HIV testing. Consistent with our qualitative research with this population (Wagner et al., 2012), men in committed relationships were almost 3 times more likely to engage in unprotected anal sex; however, men in relationships were much less likely to have unprotected sex with men whose HIV status was unknown. Nearly three-quarters of the men in relationships reported that their partner was their only sex partner in the past 3 months, and members of a couple are more likely to know each other's HIV status. In our qualitative research, men described getting tested with their partner when entering a relationship as a step towards being comfortable not using condoms when having sex with each other (Wagner et al., 2012). This all suggests that while men in relationships have more unsafe sex, the context of this unprotected sex involves several aspects of risk reduction, including mutual HIV testing and knowledge of partner's HIV status, as well as monogamy or limiting of sex partners. Yet studies of MSM in other parts of the world have shown that transmission often occurs in the context of sex with a regular partner (Sullivan, Salazar, Buchbinder, & Sanchez, 2009), implying a vulnerability for these men that may be related to greater risk taking due to a false sense of safety, and sex with partners outside of the relationship being normative yet not always known to both members of the couple (Gomez et al., 2012).

A key limitation of our data was the representativeness of our sample. While respondent-driven sampling is designed to penetrate all segments of the target population, our sample lacked in representation of men who were middle-aged, of higher socioeconomic class, and who did not identify as gay. This may be an indication that stigma may have resulted in a selection bias, as these characteristics may be associated with greater internalized stigma and reluctance to participate in a study of MSM or these may simply be characteristics of men who are less connected to other MSM. Other RDS-based studies of MSM have reported similar challenges in recruiting men with these characteristics (Yeka, Maibani-Michie, Prybylski, & Colby, 2006), perhaps as a result of insufficient incentive or lack of intrinsic

motivation to participate. Our community advisors expressed opinions that younger MSM in Beirut seem much more open and accepting of their sexual identity and more inclined to view themselves as part of a community with other MSM and thus more apt to participate. Our sample did have diversity on some variables, including religious affiliation, with an even balance of Christian and Muslim participants and the inclusion of networks of Iraqi and Syrian men who had immigrated to Beirut as a result of ongoing conflicts in their home countries. Social desirability bias is potentially another limitation given our reliance on self-reported sexual risk behavior and HIV testing, and the preference of most participants to have the survey interviewer-administered rather than answering the questions alone.

In summary, our study data revealed high rates of unprotected anal sex and vulnerability to HIV infection although few participants were actually infected with HIV or other STIs that we tested. The high rates of unsafe sex have not yet translated to a large scale HIV epidemic among MSM in Lebanon, but rates of HIV appear to be much higher in MSM than the general public, and national data suggest that the majority of new infections may be MSM (UNAIDS, 2013); hence, the potential for a future escalation of the epidemic among MSM. The high prevalence of HIV testing in the study sample is encouraging; unfortunately, likelihood of testing was lower among those at highest risk for infection, suggesting that prevention campaigns promoting HIV testing may need to be more targeted. The strength of the association between relationship status and both condom use and HIV testing, highlights the importance of the social and relational context in decision making related to these protective behaviors, but further research is needed to provide greater understanding of the psychosocial determinants of sexual risk and protective behaviors among men in relationships, as well as the larger MSM population.

Acknowledgments

Funding for this research is from a grant from the National Institute of Mental Health (Grant No. R21MH93204; PI: G. Wagner). Dr. Frost is supported in part by the National Institute of Nursing Research (Grant No. R21NR10961; PI: S. Frost, D. Heckathorn), and by a Royal Society Wolfson Research Merit Award.

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Table 1**Sample Characteristics (N = 213)**

Demographics	
Mean age in years (range)	26.2 (18–52)
Religion:	
Muslim	68 (32%)
Christian	74 (35%)
Other formal religion	5 (2%)
Don't believe in God	28 (13%)
No religious affiliation	35 (16%)
Education level:	
Completed grade school or less	74 (35%)
Completed some university	67 (31%)
Completed university	72 (34%)
Currently attending university	73 (34%)
Currently working	154 (72%)
Monthly income > \$1000 USD	62 (29%)
Born in Lebanon	150 (70%)
Refugee ^a	48 (22%)
Currently in a committed relationship	91 (43%)
Sexual orientation:	
Gay	142 (67%)
Bisexual	39 (18%)
Heterosexual	9 (4%)
Other	23 (11%)
Sexual behavior in the past 3 months	
Has had anal sex with a man	193 (91%)
Has had receptive anal sex with a man	118 (55%)
Has had any unprotected receptive anal sex with a man	90 (42%)
Has had any unprotected receptive anal sex with male partners of unknown HIV status ^b	28 (13%)
Has had insertive anal sex with a man	140 (66%)
Has had any unprotected insertive anal sex with a man	87 (41%)
Has had any unprotected insertive anal sex with male partners whose HIV status was positive ^c or unknown	28 (13%)
Has had any unprotected anal sex with a man	136 (64%)
Has had any unprotected anal sex with a male partner whose HIV status was positive ³ or unknown	49 (23%)
Last anal sex with a man: if receptive (N = 97), condom not used	69 (71%)
Last anal sex with a man: if insertive (N = 117), condom used	62 (53%)
Has had sex with a woman	32 (15%)
Had unprotected intercourse with a woman (among the 32 who had sex with a woman)	17 (53%)
HIV testing and STI history	
Has ever had an HIV test	132 (62%)
Has had an HIV test in last 12 months	90 (42%)

Self-reported having ever had any STI

104 (49%)

^a All refugees were from Syria or Iraq

^b No participants reported having unprotected receptive anal sex with HIV+ partners

^c Only one respondent reported unprotected insertive anal sex with an HIV+ partner

Table 2

Bivariate Correlates of Any Unprotected Anal Intercourse with Men and HIV Testing

	Any Unprotected Anal Intercourse (regardless of partner HIV status)		Any Unprotected Anal Intercourse (w/unknown or positive HIV status partners)		Ever been HIV tested	
	No (N = 77)	Yes (N = 136)	No (N = 164)	Yes (N = 49)	No (N = 81)	Yes (N = 132)
Mean age (years)	27.8 ^b	25.3 ^b	26.3	25.8	25.9	26.4
Currently employed	79.2% ^a	68.4% ^a	74.4%	65.3%	72.8%	72.0%
Have any university education	48.1% ^d	75.0% ^d	66.5%	61.2%	48.1% ^d	75.8% ^d
Monthly income > \$1000 USD	26.0%	30.9%	32.9% ^b	16.3% ^b	13.6% ^d	38.6% ^d
In a committed relationship	27.3% ^d	51.5% ^d	50.6% ^d	16.3% ^d	24.7% ^d	53.8% ^d
Born in Lebanon	63.6%	74.3%	72.0%	65.3%	64.2%	74.2%
Refugee	32.5% ^c	16.9% ^c	22.0%	24.5%	32.1% ^c	16.7% ^c
Self-identify as gay	49.4% ^d	75.7% ^d	64.6%	71.4%	53.1% ^c	74.2% ^c
Any history of an STI	45.5% ^d	76.5% ^d	61.0% ^b	79.6% ^b	59.3%	68.9%
Engaged in transactional sex	10.4% ^c	25.7% ^c	11.0% ^d	51.0% ^d	28.4% ^b	15.2% ^b
Discussed HIV and risk w/partner prior to sex	36.4% ^d	14.7% ^d	26.2% ^b	10.2% ^b	22.2%	22.7%
Asked HIV-negative partner when they last tested for HIV	45.5% ^b	29.4% ^b	39.6% ^b	20.4% ^b	13.6% ^d	48.5% ^d
Ever been HIV tested	59.7%	63.2%	70.7% ^d	32.7% ^d	--	--

STI = sexually transmitted infection

^a $p < .10$;^b $p < .05$;^c $p < .01$;^d $p < .001$

Table 3

Regression Analysis of Demographic Correlates of Unprotected Anal Intercourse with Men and HIV Testing

	Any Unprotected Anal Intercourse (regardless of partner HIV status)	Any Unprotected Anal Intercourse (w/ unknown or positive HIV status partners)	Ever been HIV tested
	O.R. (95% C.I.)	O.R. (95% C.I.)	O.R. (95% C.I.)
Mean age (years)	0.96 (0.90, 1.03)	1.01 (0.93, 1.09)	1.03 (0.96, 1.11)
Currently employed	0.86 (0.37, 2.00)	1.01 (0.41, 2.48)	0.60 (0.26, 1.34)
Have any university education	2.79 (1.27, 6.13) ^b	0.93 (0.39, 2.21)	2.32 (1.07, 5.04) ^b
Monthly income > \$1000 USD	1.32 (0.53, 3.27)	0.51 (0.17, 1.50)	2.50 (0.99, 6.30) ^a
In a committed relationship	2.81 (1.38, 5.72) ^c	0.15 (0.06, 0.38) ^d	4.26 (2.07, 8.80) ^d
Refugee	1.05 (0.36, 3.07)	0.92 (0.26, 3.24)	0.76 (0.26, 2.22)
Self-identify as gay	1.53 (0.65, 3.63)	1.68 (0.58, 4.86)	1.54 (0.65, 3.66)

^a
 $p < .10$;^b
 $p < .05$;^c
 $p < .01$;^d
 $p < .001$

Note that each of the models included these characteristics of the person who recruited the respondent as covariates: age and binary indicators of gay self-identification, born in Lebanon, high income, and recent sex with women.