

PREDICTORS OF UNPROTECTED SEX AMONG MEN WHO HAVE SEX WITH MEN IN BEIJING, CHINA

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Abstract. To estimate the prevalence of HIV and syphilis and to assess the predictors of unprotected anal intercourse (UAI) among men who have sex with men (MSM) in Beijing, a community-based survey recruited MSM in 2005 through internet advertisement, community outreach, and peer referral. Demographic, sexual, and HIV risk behavioral information were collected. Serospecimens were tested for HIV and syphilis infections. Of the 526 participants, 3.2% were HIV-positive, 11.2% syphilis-positive, 50% and 43.3% had UAI with regular and casual sex partners, respectively. Participants practicing UAI with regular male partners were independently associated with lower monthly income (adjusted odds ratio-AOR, 1.7; 95% CI, 1.0-3.0) and encountering male sex partners at bathhouses, public washrooms, and parks (AOR, 2.2; 95% CI, 1.0-4.9). Participants practicing UAI with casual male partners were associated with encountering male sex partners at bathhouses, public washrooms, and park (AOR, 3.0; 95% CI, 1.8-5.2) and more male sex partners having receptive anal intercourse (AOR, 1.8; 95% CI, 1.1-2.9), and was inversely associated with receiving money for sex with men (AOR, 0.3; 95% CI, 0.2-0.7). Professional male sex workers were less likely to practice UAI in Beijing, suggesting the benefits of educational outreach to date. Further education, condom promotion, and prevention of sexually transmitted infections should be intensified urgently to combat the rising HIV epidemic among MSM in Beijing.

INTRODUCTION

An estimated 650,000 Chinese were living with HIV/AIDS in 2005; the trend of the epidemic is still on the rise (China MOH *et al*, 2005). By transmission categories, injection drug users (IDUs) accounted for the largest proportion of persons living with HIV (44.3%), followed by sex workers and their clients (19.6%), partners of HIV-positive individuals and members of the general population

(16.7%), and former blood donors and recipients of blood products (10.7%), acknowledging that past cases were more likely to have been due to commercial blood and plasma donation and receipt of blood products (China MOH *et al*, 2005). Less data are available on men who have sex with men (MSM) in China, but about 47,000 MSM were estimated to be living with HIV/AIDS in 2005, accounting for 7.3% of persons living with HIV/AIDS (China MOH *et al*, 2005).

High HIV prevalence rates reported among MSM in several Asian countries have drawn attention, including in Phnom Penh, Cambodia (8.9%), Chiang Mai, Thailand (15.3%), and Andhra Pradesh, India (18.2%)

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(CDC, 2006). There has been a rapid rise in HIV prevalence among MSM in Bangkok, from 17.3% in 2003 to 28.3% in 2005 (United Nations Program on HIV/AIDS, 2006). Recent studies suggest unprotected risk behavior or sexually transmitted diseases (STDs) among MSM have been found commonly in several cities in China (Zhang *et al*, 2000; Qu *et al*, 2002b; Choi *et al*, 2003; Gu *et al*, 2004; Cai *et al*, 2005; Qian *et al*, 2005; He *et al*, 2006; Jiang *et al*, 2006; Liu *et al*, 2006; Lu *et al*, 2006). Disturbing HIV prevalence rates from 1.0 to 5.0% among MSM have been reported in several urban cities (Qu *et al*, 2002b; Gu *et al*, 2004; Cai *et al*, 2005; Lu *et al*, 2006); higher than the overall prevalence (0.05%) for China. Without timely action, MSM could become the second most at risk group for HIV infection following injection drug users in China (Zhang and Chu, 2005).

Nationwide behavioral surveys among MSM conducted in 2001 found that 66.2% of participants reported having insertive unprotected anal intercourse (UAI) and 57.0% receptive UAI with male partners, and 18.5% reported having group sex (Zhang *et al*, 2002). Other studies found that 15-30% of MSM were married or remarried largely due to social pressure, suggesting that MSM having unprotected sex and bisexual activities may be a bridge for transmission of HIV and other sexually transmitted diseases (STD) to the general population (Zhang *et al*, 2000; Qu *et al*, 2002b; Choi *et al*, 2003; Gu *et al*, 2004; Cai *et al*, 2005; Qian *et al*, 2005; CDC, 2006; He *et al*, 2006; Jiang *et al*, 2006; Liu *et al*, 2006; Lu *et al*, 2006; China *et al*, 2005; United Nations Program on HIV/AIDS, 2007). The sexual risk behaviors among MSM are well described worldwide, but little is available concerning predictors for unprotected sex and other high risk behavior among MSM in China. This is of vital importance given the rising HIV prevalence in this population. Our study was to estimate the prevalence of HIV and syphilis in-

fections and predictors for UAI among MSM in Beijing.

MATERIALS AND METHODS

Participants and recruitment

A community-based cross-sectional study was conducted among MSM in Beijing from June to November of 2005. The participants were recruited through website advertisements (<http://www.Chinaids.org.cn> and <http://www.hivolunt.net>) and peer recruiters trained for outreach among MSM in clubs, bars, parks, and bathhouses. All potential participants were invited to a community-based voluntary counseling and testing (VCT) clinic for eligibility assessment. Enrollment criteria included male sex, reports of having sex with other males in the past 6 months and willingness to finish the study and provide written informed consent. The study proposal was approved by the institutional review board (IRB) of the National Center for AIDS/STD Control and Prevention of the China Center for Disease Control and Prevention (CDC) and the IRB of Vanderbilt University Medical Center.

Data collection

Questionnaire-based interviews were conducted in a private room in a local district clinic. Data were collected including sociodemographic information (*eg*, age, ethnicity, education, employment, marital status, and income), sexual, and HIV risk behavioral information (*eg*, sexual orientation, age of initiating sex with men, lifetime number of male sex partners, commercial sex with male sex partners, new male sex partners, insertive UAI with regular or casual male partners, receptive UAI with regular or casual male sex partners, unprotected vaginal sex with regular or casual sex partners, and illicit drug use).

HIV and syphilis infection tests

Blood samples were collected from all participants for HIV and syphilis. HIV infection status was determined by enzyme immunoas-

say (EIA) (Beijing Wantai Biological Medicine, China) testing and confirmed with a HIV-1/2 Western blot (HIV Blot 2.2 WB™, Genelabs Diagnostics). Syphilis infection was determined using an EIA (Beijing Wantai Biological Production, Beijing, China) and confirmed with a passive particle agglutination test for detection of antibodies to *Treponema pallidum* (TPPA™, OMEGA, UK).

Statistical analysis

EpiData software (EpiData 3.0 for Windows™, The EpiData Association Odense, Denmark) and Statistical Analysis System (SAS 9.1 for Windows™, SAS Institute, Cary, NC, USA) were utilized for data analysis. Prevalence rates of HIV and syphilis and 95% confidence intervals (CI) were calculated by the exact binomial procedure. Multivariable logistic regression models were constructed to identify the independent risk factors for UAI with both regular and casual male sex partners, controlling for potential confounding and interacting factors.

RESULTS

Participants and enrollment

Five participants refused to participate in this study and seven withdrew; refusing to answer the sensitive questions regarding sexual behavior. A total of 526 participants were eligible and completed the study (Table 1), HIV prevalence was 3.2%, and syphilis prevalence was 11.2%. Of the 526 participants, 65.8% were from age 21 to 30 years, 94% belonged to Han ethnic group, 62.0% received college or higher level of education, 18.0% were married or cohabited with male or female sex partners, and non-Beijing residents accounted for 64.3%.

Participants identified as exclusively homosexual and predominantly homosexual accounted for 69.4% and 24.3%, respectively, whereas 6.3% of the participants were identified as predominantly heterosexual with only

incidentally homosexual activities. Approximately 26.0% previously had more than 20 male sex partners and 30.0% previously had sex with female sex partners during their lifetime. During the previous 6 months, about 12.0% of participants had more than 10 male sex partners and 11.0% had sex with female sex partners; 11.2% participated in male group sex; 4.2% paid and 8.6% received money for sex with men. Participants reported had insertive and receptive UAI with regular male sex partners accounted for 35.9% and 26.6% in the previous 6 months, respectively. Participants had insertive and receptive UAI with casual male sex partners in 35.7% and 33.6%, respectively. Participants had UAI regular and casual female sex partners in 5.5% and 2.8%, respectively. Two point five percent of participants used illicit drugs in the previous 6 months.

Sexual behavior with regular or casual male sex partners

Of the 526 participants, 64.0% and 69.0% had previously engaged in anal intercourse with regular or casual male sex partners in the previous 6 months, respectively. These participants were more likely to have the UAI (78.6% vs 63.2%, $p < 0.001$), insertive UAI (78.1% vs 58.6%, $p < 0.001$), or receptive UAI (76.4% vs 64.6%, $p < 0.01$) with regular male sex partners than with casual male sex partners (Table 2).

Predictors of practicing UAI with regular or casual male sex partners

Bivariate analyses found that practicing UAI with regular male sex partners was associated with lower monthly income, encountering male sex partners at bathhouses, public washrooms, or parks, or using illicit drugs (Table 3). Practicing UAI with casual male sex partners was associated with younger participants, lower monthly income, encountering male sex partners at bathhouses, public washrooms, or parks, more male sex partners in the previous 6 months, receiving money for

Table 1
 Characteristics of men who have sex with men in Beijing, China.

Variables	No.	%
Overall sample size	526	
Age (yr)		
17-20	78	14.8
21-30	346	65.8
31-54	102	19.4
Ethnicity		
Han	494	93.9
Minority ^a	32	6.1
Education		
Junior high school or less	65	12.4
Senior high school	135	25.7
Some college or higher	326	62.0
Marital status		
Single/Bachelorhood	408	77.6
Married/Cohabited with male or female sex partners	95	18.1
Separated/Divorced/Widowed	23	4.4
Beijing permanent residents	188	35.7
Sexual orientation		
Exclusively homosexual	365	69.4
Predominantly homosexual	128	24.3
Predominantly heterosexual	33	6.3
Lifetime number of male sex partners		
1-5	198	37.6
6-10	113	21.5
11-20	77	14.6
>20	138	26.2
Number of male sex partners in P6M		
1	181	34.4
2-5	208	39.5
6-10	76	14.4
>10	61	11.6
Ever had sex with female sex partners	152	28.9
Had sex with female sex partners in the past six months	56	10.6
Participated in male group sex in the past six months	59	11.2
Gave money for sex with men in the past six months	22	4.2
Received money for sex with men in the past six months	45	8.6
Unprotected sex with male or female sex partners in the past six months		
Had unprotected insertive anal sex with regular male sex partners	189	35.9
Had unprotected receptive anal sex with regular male sex partners	140	26.6
Had unprotected insertive anal sex with casual male sex partners	188	35.7
Had unprotected receptive anal sex with casual male sex partners	177	33.6
Had unprotected sex with regular female sex partners	29	5.5
Had unprotected sex with casual female sex partners	15	2.8
Used illicit drugs in the past six months ^b	13	2.5
HIV positive	17	3.2
Syphilis positive	59	11.2

^a including Hui, Manchu, Uigur, Dai, Salar, Yao, and Zhuang; ^bincluding: Ecstasy, Ketamine, and Marijuana

Table 2
Sexual behaviors by regular or casual male sex partners among men who have sex with men in the past six months in Beijing, China.

Variables	Regular male sex partners		Casual male sex partners		p-value
	%	n/N	%	n/N	
Any unprotected anal intercourse	78.6	264/336	63.2	228/361	<0.0001
Insertive anal intercourse	72.0	242/336	66.2	239/361	0.10
Unprotected insertive anal intercourse	78.1	189/242	58.6	140/239	<0.0001
Receptive anal intercourse	73.2	246/336	75.9	274/361	0.40
Unprotected receptive anal intercourse	76.4	188/246	64.6	177/274	0.003

n = number of positive responses; *N* = sample/sub-sample

sex with men in the previous 6 months, and more male sex partners of receptive anal intercourse in the previous 6 months. Multivariable logistic regression analyses showed that practicing UAI with regular male partners was independently associated with lower monthly income (OR, 1.7; 95% CI, 1.0-3.0) and encountering male sex partners at bathhouses, public washrooms, or parks (OR, 2.2; 95% CI, 1.0-4.9). Practicing UAI with casual male partners was associated with encountering male sex partners at bathhouses, public washrooms, or parks (OR, 3.0; 95% CI, 1.8-5.2) and having more male sex partners with receptive anal intercourse (OR, 1.8; 95% CI, 1.1-2.9), and was inversely associated with receiving money for sex with men (OR, 0.3; 95% CI, 0.2-0.7).

DISCUSSION

Our study found a large proportion of participants had a college or higher education (62.0%) or were non-local residents (64.0%). Two thirds of the participants were ≤ 26 years old, which is consistent with other studies in Beijing (Qu *et al*, 2002b; Choi *et al*, 2003; Cai *et al*, 2005). The number of participants in this study with exclusively homosexual activities was more than that of those with predominantly homosexual or heterosexual activities, which differs from previous studies.

Two studies found the number of MSM who were self-identified as gay or homosexual surpassed those who identified themselves as bisexual or heterosexual in absolute numbers (Zhang *et al*, 2002; Choi *et al*, 2003), yet another study found the opposite (Gu *et al*, 2004).

Homosexual activities are not illegal in China, but they are not socially acceptable. Homosexual or bisexual activities are highly stigmatized, and MSM are often married and under social pressure to hide their sexual orientation (Liu and Choi, 2006; Wong *et al*, 2006). Education regarding safer sex practices and exploring research among MSM are huge challenges since they are socially marginalized and hard to reach. Three quarters of participants in this study were single, one fifth were married or cohabited, which is similar to other studies among MSM in China (Qu *et al*, 2002b; Choi *et al*, 2003; Gu *et al*, 2004; Cai *et al*, 2005; Liu and Choi, 2006; Lu *et al*, 2006). We also found 5.5% of participants had unprotected sex with female partners. These married MSM and bisexual men may serve as a potential bridge for HIV transmission to women (Qu *et al*, 2002a), especially when HIV prevalence rates reach relatively high levels, and risky sexual practices are common.

High prevalences of multiple male sex partners and commercial sex workers were

Table 3
Prevalence of unprotected anal intercourse (UAI) and associated predictors by regular or casual male sex partners among men who have sex with men in the past six months (P6M) in Beijing, China.

Variable	Anal sex with the regular male sex partners				Anal sex with the casual male sex partners			
	No.	UAI (%)	OR (95% CI)	AOR (95% CI)	No.	UAI (%)	OR (95% CI)	AOR (95% CI)
Overall	336	78.6			361	63.2		
Age (median, years)								
≤26	215	76.7	1.0		225	58.7	1.0	
>26	121	81.8	1.36 (0.78-2.39)		136	70.6	1.69 (1.07-2.66) ^b	
Ethnicity								
Han	313	79.6	1.0		340	63.5	1.0	
Minority	23	65.2	0.48 (0.20-1.19)		21	57.1	0.76 (0.31-1.87)	
Education								
Senior high school or less	110	78.2	1.0		165	64.8	1.0	
Some college or higher	226	78.8	1.03 (0.60-1.80)		196	61.7	0.87 (0.57-1.34)	
Monthly income								
>200 US dollars	170	73.5	1.00	1.00	178	57.9	1.00	
≤200 US dollars	166	83.7	1.85 (1.08-3.16) ^b	1.74 (1.01-2.98)	183	68.3	1.57 (1.02-2.41) ^b	
Married/cohabited with male or female partners								
No	262	77.1	1.0		310	62.3	1.0	
Yes	74	83.8	1.53 (0.78-3.04)		51	68.6	1.33 (0.70-2.50)	
Had Beijing residence card								
No	210	77.1	1.0		244	63.1	1.0	
Yes	126	81.0	1.26 (0.73-2.18)		117	63.2	1.00 (0.64-1.59)	
Found male sex partners through Internet								
No	81	76.5	1.0		114	64.9	1.0	
Yes	255	79.2	1.17 (0.64-2.12)		247	62.4	0.90 (0.56-1.42)	
Found male sex partners through bathhouses, public washrooms, or parks								
No	267	76.0	1.0	1.0	250	56.0	1.0	1.0
Yes	69	88.4	2.40 (1.09-5.29) ^b	2.22 (1.00-4.91)	111	79.3	3.01 (1.78-5.07) ^a	3.02 (1.76-5.17)
Number of male sex partners, P6M								
≤2	205	80.0	1.0		109	54.1	1.0	
>2	131	76.3	0.81 (0.48-1.37)		252	67.1	1.72 (1.09-2.73) ^b	
Participated in male group sex, P6M								
No	295	80.0	1.0		305	63.6	1.0	
Yes	41	68.3	0.54 (0.26-1.10)		56	60.7	0.88 (0.49-1.59)	
Gave money for sex with men, P6M								
No	318	78.3	1.0		343	63.3	1.0	
Yes	18	83.3	1.38(0.39-4.92)		18	61.1	0.91 (0.34-2.41)	

Received money for sex with men, P6M									
No	308	79.2	1.0	318	65.4	1.0	1.0	1.0	
Yes	28	71.4	0.66 (0.28-1.56)	43	46.5	0.46 (0.24-0.87) ^b	0.34 (0.17-0.68)		
Number of male sex partners of insertive anal intercourse, P6M									
≤2	260	78.1	1.0	230	59.6	1.0			
>2	76	80.3	1.14 (0.60-2.16)	131	69.5	1.54 (0.98-2.44)			
Times of the insertive anal sex with male sex partners, P6M									
≤5	184	76.1	1.0	228	64.9	1.0			
>5	152	81.6	1.39 (0.82-2.37)	133	60.2	0.82 (0.52-1.27)			
Number of male sex partners of receptive anal intercourse, P6M									
≤2	251	78.9	1.0	192	57.3	1.0			
>2	85	77.6	0.93 (0.51-1.68)	169	69.8	1.72 (1.11-2.67) ^a	1.80 (1.13-2.86)		
Times of the receptive anal sex with male sex partners, P6M									
≤5	181	76.8	1.0	214	63.1	1.0			
>5	155	80.6	1.26 (0.74-2.13)	147	63.3	1.01 (0.65-1.56)			
Used illicit drugs, P6M									
No	329	79.3	1.0	348	63.8	1.0			
Yes	7	42.9	0.20 (0.04-0.89) ^b	13	46.2	0.49 (0.16-1.48)			

OR: odds ratio; CI: confidence interval; AOR: adjusted odds ratio; ^ap<0.01; ^b0.01<p<0.05

found in several cities in China, suggesting a potential risk for rapid spread of HIV among MSM (Choi *et al*, 2003; 2004; He *et al*, 2006; Wong *et al*, 2006). Our findings showed that 40.0% of participants had more than 10 male sex partners in their lifetime, 26.0% had more than 5 male sex partners in the previous 6 months, and nearly 4.0% paid and 9.0% received money for sex with men, respectively.

Similar to the findings among MSM in Seattle and San Diego (Choi *et al*, 2002), this study demonstrated a high prevalence of UAI with regular (80%) and casual (60%) male partners in the previous 6 months, and participants were more likely to have any UAI with regular male partners than with casual male partners. MSM in steady relationship may not always be monogamous, and HIV status of MSM couples may be discordant, so having UAI with regular male partners may expand HIV transmission (Elford *et al*, 1999; Dodds *et al*, 2004). Thus, future prevention programs for MSM should not ignore the UAI in regular male partners.

Multivariable logistic regression analysis in this study indicated that lower income, encountering male sex partners at bathhouses, public washrooms, or parks, and more male sex partners had an influence on MSM having UAI with regular or casual male sex partners, or both. A survey in India indicated that the lower the income MSM were more likely to not use a condom for anal sex (Dandona *et al*, 2005). Socioeconomic status has an influence on condom use. A study in Hong Kong revealed that being an internet sex networker was associated with having engaged in anal sex, and more than 60% of internet sex networkers who had engaged in anal sex had UAI (Lau *et al*, 2003). However, considering the economic status and education levels of MSM in mainland China, MSM who found male sex partners at bathhouses, public washrooms or parks were more likely to engage in UAI, which also were associated with not carrying condom in a public place (Hart *et al*, 2004).

It is interesting that this study showed professional male sex workers were less likely to engage in UAI with casual male sex partners, which is similar to the finding in San Francisco (Ekstrand *et al*, 1999), however our earlier studies in the same region concluded differently, that professional sex workers were more likely to engage in receptive UAI (Choi *et al*, 2004). As expected, this study found that MSM having more male sex partners were more likely to practice UAI, which is consistent with previous findings (Ruiz *et al*, 1998; Choi *et al*, 2002, 2004; Jiang *et al*, 2006).

Compared with many western countries, the HIV prevalence rate among MSM in China is relatively low: 3.2% was found in this study. Cross-sectional surveys in London indicated ≈11% of MSM were HIV positive (Dodds *et al*, 2004), and almost 9% in California (Ruiz *et al*, 1998). MSM accounts for a large proportion of HIV cases in many western countries. Over 40% of cumulative reported AIDS cases in the United States through 2005 were related to male-to-male sexual contact (CDC, 2005). MSM accounts for 40% of AIDS cases from 2001 to 2005 in Germany, 49% in 2003-2004 for Netherlands, and 32% in 2004 for the UK (Van der Poel *et al*, 2007). Illicit drug use is not common among Chinese MSM. Only 2.5% of participants in our study used illicit drugs in the past 6 months, and 0.5% (1/201) were reported in another study in China (He *et al*, 2006). Little relationship has been demonstrated between drug users and MSM in China. Drug abuse is common among MSM in the western countries and often constitutes a major risk for HIV spread in this population (Bluthenthal *et al*, 2001; Thiede *et al*, 2003; Kral *et al*, 2005).

The large overlap between HIV and syphilis among the participants in this study demonstrates the consequences of unprotected risk behavior and it poses a particular concern that syphilis could further facilitate the transmission of HIV (Cohen, 2004). A case-

control study in New York found that MSM with regular and secondary syphilis were sevenfold more likely than controls to be infected with HIV (Paz-Bailey *et al*, 2004). Our study found that 11.2% of participants were infected with syphilis, which is similar to four studies (7-20%) in China (Gu *et al*, 2004; Cai *et al*, 2005; He *et al*, 2006; Jiang *et al*, 2006). A systematic review has suggested the prevalence rate of syphilis seropositivity among MSM increased among MSM in certain cities of China (Lin *et al*, 2006).

Our data were collected through multiple sampling methods instead of a random sampling method. The findings should be interpreted carefully when generalizing to the larger MSM population and compared with results from other studies.

Given that MSM practicing UAI are more likely to recruit other men for sex, and do so in public settings, suggests that interventions must be offered in outreach programs that actually reach men in these venues. Commercial male sex workers were less likely to practice UAI in Beijing, suggesting the benefits of educational outreach to date. The findings from this study further underscored that education, condom promotion, prevention and control of sexually transmitted infections should be intensified urgently to combat the rising HIV epidemic among MSM in Beijing.

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