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Gay Saunas and the Risks of HIV and Syphilis Transmissions in China—Results of a Meta-Analysis

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ABSTRACT

Introduction. Previous studies suggest the risk of human immunodeficiency virus (HIV) transmission among men who have sex with men (MSM) is associated with characteristics of venues. However, very few studies have systematically compared HIV/sexually transmitted disease (STD) prevalence among MSM according to key venue type for sourcing sex partners.

Aims. The aim of this study was to investigate the associations between HIV/syphilis prevalence and the types of venues, namely saunas, parks, gay bars, and the Internet, which are mostly used for sourcing male sex partners by MSM in China.

Methods. Meta-analyses using fixed-effect and random-effect methods were conducted. Secondary data were obtained from 10 concurrent surveys conducted in 10 cities basing on a common protocol. Pairwise comparisons (e.g., "saunas" vs. "parks") were made.

Main Outcomes Measures. Odds ratios (OR) for HIV/syphilis infection in relations to venue type for partner sourcing.

Results. The distribution of the most commonly used source to recruit male sex partner was 59.32% (Internet), 18.47% (gay bars), 14.18% (gay saunas), and 8.02% (parks). The median prevalence of HIV/syphilis was 10.49% and 19.38% (gay saunas), 2.12% and 16.25% (parks), 6.06% and 15.45% (Internet), and 4.41% and 11.90% (gay bars). We found significant between-group differences when comparing "sauna" against "Internet" (HIV: OR = 2.27, 95% confidence interval [CI] = 1.65–3.12; syphilis: OR = 1.61, 95% CI = 1.07–2.41), "sauna" against "bars" (HIV: OR = 1.65, 95% CI = 1.14–2.39; syphilis: OR = 1.35, 95% CI = 1.02–1.78), and "parks" against "Internet" (syphilis: OR = 1.55, 95% CI = 1.12–2.15) as the main source to recruit male sex partners. Other pairwise comparisons were not statistically significant.

Conclusions. The results of this study suggest that those sourcing partners mainly from gay saunas have higher prevalence of HIV/syphilis when compared with those doing so via the Internet or gay bars. Venue based (sauna-based) interventions using socio-ecological approaches are greatly warranted in order to reduce HIV and syphilis prevalence among MSM in China. **Lau JTF, Zhao J-K, Wu X-B, Gu J, and Hao C. Gay saunas and the risks of HIV and syphilis transmissions in China—results of a meta-analysis. J Sex Med 2013;10:642–652.**

Key Words. Men Who Have Sex with Men (MSM); Gay Sauna; Syphilis; HIV; Meta-Analysis; China

Introduction

The human immunodeficiency virus (HIV) prevalence among men who have sex with men (MSM) in China has been increasing sharply [1]. A survey covering over 18,000 MSM in 61 Chinese cities was conducted during 2008 and 2009, reported an average HIV prevalence of 5.0% [2]. Another recent cohort study conducted in Nanjing, China, in 2008 recorded a high HIV

incidence of 5.12 per 100 person-years [3]. Recent studies reported the syphilis prevalence ranging from 13.5% to 27.7% among MSM in China [4–6]. The epidemiological data are extremely alarming.

In China, MSM encounter severe stigma a high proportion of them hence remain closeted [7]. The lack of social space for dating among MSM may force them to recruit male sex partners from venues such as gay bars, gay saunas, or via gay websites [8,9]. Concentrated high-risk behaviors occur in gay venues. Paradoxically, such venues also provide a platform for offering structured venue-based HIV interventions targeting MSM [10].

Many of the surveys targeting MSM collected data from gay venues or via the Internet [11–17]. Some of these studies focused on methodological issues concerning the relationships between venue type and the study results [11,13,15]. For instance, previous studies that were conducted in Hong Kong and the United Kingdom showed that participants recruited via the Internet had higher prevalence of risk behaviors such as unprotected anal intercourse (UAI) and multiple partnerships, as compared with those recruited from other gay venues [18,19]. Other studies showed that participants recruited from some venues, such as gay saunas, had higher prevalence of HIV/sexually transmitted disease (STD), as compared with participants recruited from other sources [20,21]. A cohort study reported that "sourcing male sex partners mostly from saunas" is a significant predictor of HIV seroconversion, with a relative risk of 2.35 [3].

Gay saunas operate quite openly in China information and addresses are available in most of the Chinese gay websites and are known to the majority of MSM. Some countries, excluding China, have established policies governing gay saunas or have house rules within saunas to reduce the chance of having high-risk behaviors occurring on-site [22]. Prevention efforts targeting gay saunas in China are at the preliminary stage. In some individual cities in China, limited but sporadic outreach work in gay saunas has been provided by some peer MSM health educators. Nevertheless, there are studies showing that condom availability is a factor associated with UAI taking place in gay saunas [12,23,24]. Previous studies also showed that the high risk of HIV transmission exist while cruising in parks [25,26]. Very few studies have systematically compared HIV/STD prevalence among MSM according to key venue type for sourcing sex partners [4,27], although there are a number of studies reporting variations in HIV/STD prevalence according to where the survey took place [20,21,28]. There are in fact two different types of studies regarding gay venues those investigating variations by site of partner sourcing and those investigating variations by site of data collection. Regarding the latter, a respondent recruited from a bar, for instance, may also go to saunas or other gay venues so that the interpretation is less specific than it sounds. It is important to find out whether having gay sauna and/or other gay venues as the main sites for sourcing sex partners is going to catalyze HIV/STD transmissions in China. The results have important policy and programming implications.

Aims

In the 2008 national survey conducted in China [2], a question asked about the type of venue where the MSM respondents mostly sourced their sex partners (gay saunas, gay bars, Internet, and parks). Relevant data were obtained from 10 of the 61 cities in China, and a meta-analysis was performed in this study to investigate whether the prevalence of HIV and syphilis was associated with the main venue type for sourcing male sex partners among MSM in China.

Methods

Sources of Information

The required information was obtained from 10 cross-sectional surveys, which were a subset of the 61-city national survey conducted in 2008 [2]. These surveys used the same standard questionnaire and research methodology. The results of two of these surveys were published in a peer-reviewed journal [27,29]. The required information of this study was obtained by writing to respective investigators or respective Centers for Disease Control and Prevention (CDC). A standard information entry form was used cross tabulating the observed frequencies of number of positive HIV and syphilis cases by key venue type for partner sourcing. ("Which source did you use mostly to recruit male sex partners in the last 6 months?" A single response was allowed, including gay saunas, gay bars, the Internet, or parks.) A total of 11 requests were made, and 10 CDC returned the completed form to the authors. The sample size of these surveys ranged from 260 to 1,046

Table 1 Prevalence of HIV and syphilis among MSM in 10 Chinese cities via varied key venue types for sourcing sex partners

Study site	Sampling method*	Number of responders					Prevalence of HIV (%)					Prevalence of syphilis (%)				
		Total	Sauna	Bar	Park	Internet	Overall	Sauna	Bar	Park	Internet	Overall	Sauna	Bar	Park	Internet
City 01	1	1,046	142	215	6	683	5.45	10.56	3.26	0.00	5.12	19.98	21.13	17.21	0.00	20.79
City 02	2	433	58	71	31	273	12.93	18.97	18.31	22.58	9.16	9.01	6.90	5.63	6.45	10.62
City 03	3	548	26	95	21	406	15.69	23.08	16.84	9.52	15.27	11.50	15.38	13.68	9.52	10.84
City 04	3	357	25	28	57	247	5.32	8.00	3.57	3.51	5.67	17.65	28.00	28.57	24.56	13.77
City 05	3	429	91	59	63	216	4.66	6.59	3.39	6.35	3.70	19.35	29.67	18.64	26.98	12.96
City 06	3	453	23	17	138	275	2.43	13.04	0.00	0.72	2.55	7.73	4.35	17.65	7.25	7.64
City 07	3	398	68	68	19	243	4.77	10.29	7.35	0.00	2.88	12.81	29.41	8.82	21.05	8.64
City 08	1 and 2	381	90	126	8	157	4.20	5.56	4.76	0.00	3.18	11.29	14.44	12.70	12.50	8.28
City 09	2	260	48	74	5	133	7.69	10.42	9.46	0.00	6.02	15.00	18.75	12.16	20.00	15.04
City 10	2	285	80	95	20	90	7.72	11.25	7.37	15.00	3.33	21.75	20.00	23.16	35.00	18.89
Total/median†		4,590	651	848	368	2,723	5.39	10.49	6.06	2.12	4.41	13.91	19.38	15.45	16.25	11.90

*Sampling method: 1 = venue-based sampling, 2 = snowball sampling, 3 = respondent-driven sampling
†Total/median: total was for the number of responders only; median was for prevalence of HIV and prevalence of syphilis among 10 cities.

(mean = 459, standard deviation = 222; see Table 1), and the total sample size was 4,590, which accounted for about one-quarter of the total sample in 61 cities.

The Surveys

The survey methodology of the individual surveys has been described in detail in some published reports [27,29]. Five of the 10 surveys used venue-based sampling methods and/or snowballing methods, while the other five surveys used respondent-driven sampling methods (Table 1). Eligibility criteria included those who self-reported having had oral or anal sex with men in the last 12 months, aged 18 years or over when the survey was conducted. With verbal informed consent, anonymous face-to-face questionnaire interviews were administered by peer MSM workers in some private rooms. After pretest counseling, a 5 mL blood specimen was taken from the participants for HIV and syphilis testing. Following a face-to-face interview, participants were informed about the results of the HIV rapid testing, and posttest counseling was provided to them thereafter. Those showing an HIV-positive rapid test result were asked to return to the CDC in person after 2 weeks to receive the confirmatory result by the method of Western Blot test. Those with confirmed HIV-positive status received additional posttest counseling and were referred to receive HIV-related services. Participants were informed about the syphilis testing result within 2 weeks by phone. Those who tested positive for syphilis were referred to receive relevant treatments and services. Ethics approval of the original studies was granted from the China CDC.

The 10 cities were located in different parts of China (one in Central China, one in Northeastern China, two in Southern China, two in Southwestern China, and four in Eastern China). The cities were chosen because the authors have personal contacts with the CDCs of those cities. It was also attempted to cover different parts of China. The population size of the 10 cities ranged from 4,459,760 to 28,846,170 [30]. These cities made up 8.46% of the total population of China.

Statistical Analysis

Meta-analysis was conducted by using the Review Manager 5.0 (RevMan 5.0, The Cochrane Collaboration, The Nordic Cochrane Centre, Copenhagen, Denmark, 2008). Six pairwise comparisons by venue type for male partner sourcing were performed ("saunas" vs. "bars," "saunas" vs. "Internet," "saunas" vs. "parks," "parks" vs. "bars," "parks" vs. "Internet," and "Internet" vs. "bars"). Chi-square test for heterogeneity was performed. Fixed-effects models were used when the test for heterogeneity showed $P > 0.1$. Otherwise, random effects models were used. The weights and odds ratios (ORs) with respective 95% confidence intervals (CIs) were presented.

Results

Venue Type for Partner Sourcing and HIV/Syphilis Prevalence

Participants were most likely to source male sex partners from the Internet (59.32%), followed by bars (18.47%), saunas (14.18%), and parks (8.02%). The HIV prevalence of the 10 sites ranged from 2.43% to 15.69% (median = 5.39%), whereas the syphilis prevalence ranged from 7.73% to 21.75% (median = 13.91%; see Table 1). The median of HIV and syphilis

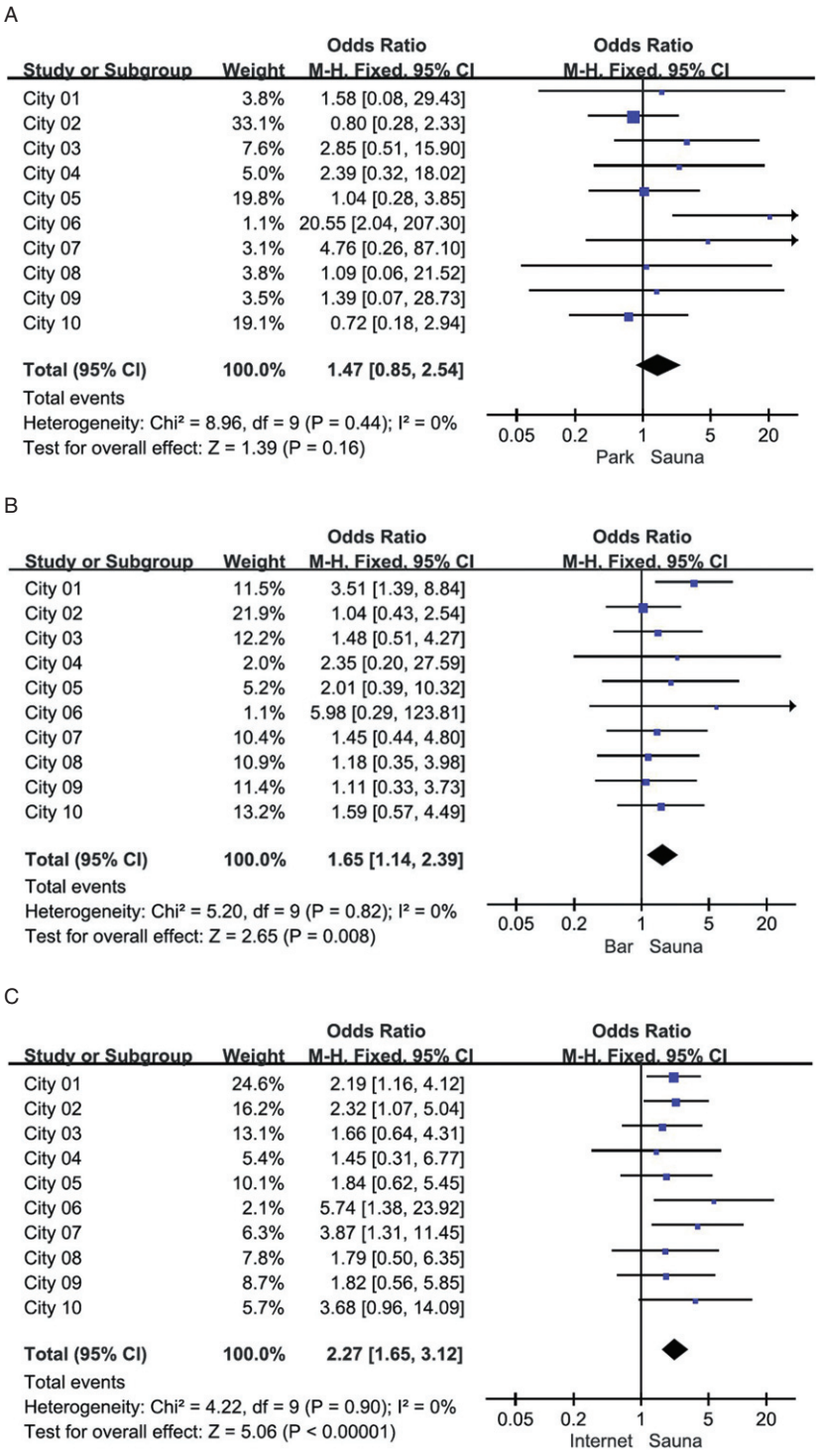

Figure 1 Meta-analysis on the associations between HIV prevalence and type of venue mostly used by MSM in China to source their male sex partners. (A) Sourcing mainly via saunas vs. mainly sourcing via parks. (B) Sourcing mainly via saunas vs. mainly sourcing via bars. (C) Sourcing mainly via saunas vs. mainly sourcing via Internet. (D) Sourcing mainly via parks vs. mainly sourcing via bars. (E) Sourcing mainly via parks vs. mainly sourcing via Internet. (F) Sourcing mainly via Internet vs. mainly sourcing via bars.

prevalence according to the main type of venue used for male sex partner sourcing was 10.49% and 19.38% (saunas), 2.12% and 16.25% (parks), 6.06% and 15.45% (Internet), and 4.41% and 11.90% (bars).

Comparing HIV and Syphilis Prevalence by Venue Type for Partner Sourcing

The results were summarized in Figure 1. It was noted that the HIV prevalence was significantly higher when sauna was the key venue type for male

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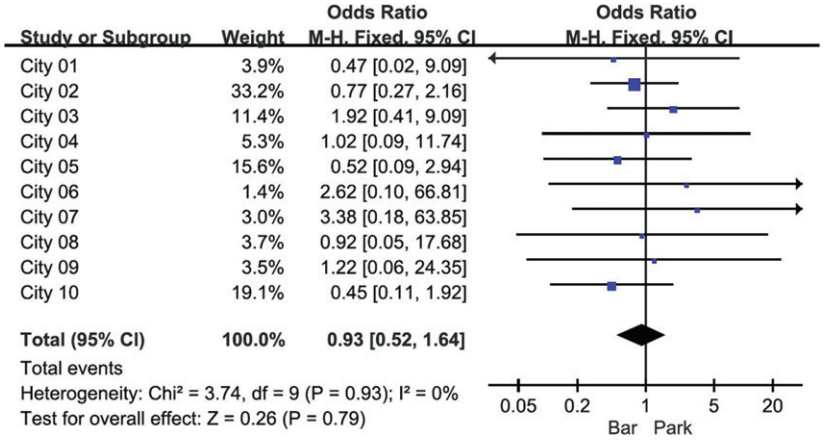

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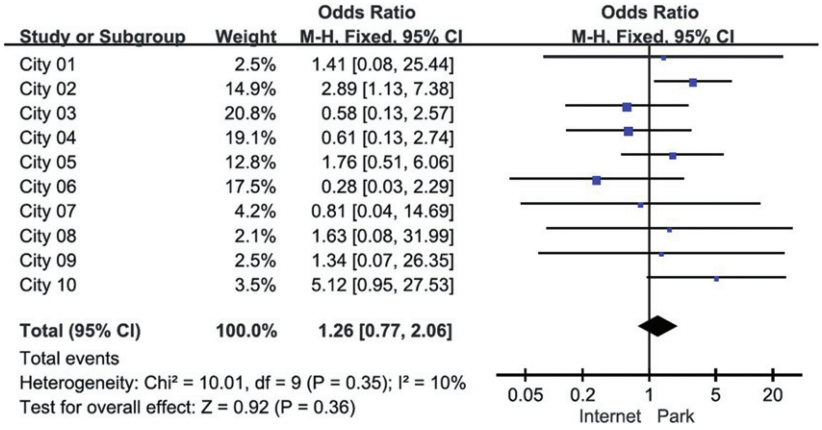

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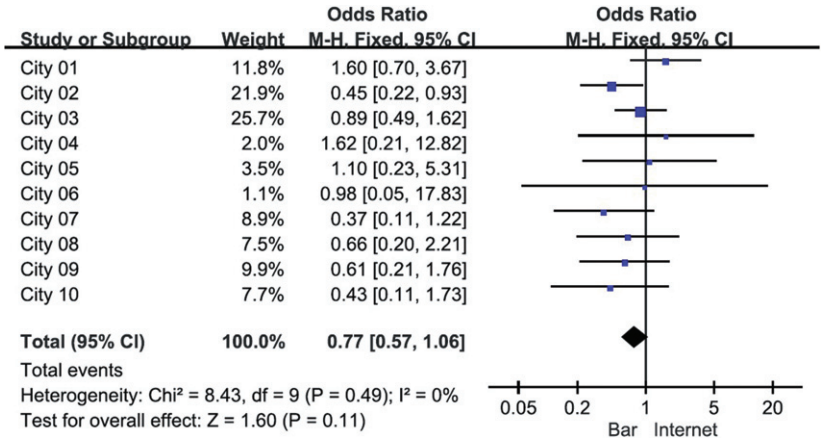

Figure 1 Continued.

sex partner sourcing than when the Internet (OR = 2.27, 95% CI = 1.65–3.12) or bars were mostly used for male sex partner sourcing (OR = 1.65, 95% CI = 1.14–2.30). Those sourcing male sex partners mostly from saunas were not different in HIV prevalence as compared with those sourcing male sex partners mostly from parks (OR = 1.47, 95% CI = 0.85–2.54). Other pairwise comparisons ("Internet" vs. "bars," "bars" vs. "parks," and "Internet" vs. "parks") were statistically nonsignificant (Figure 1).

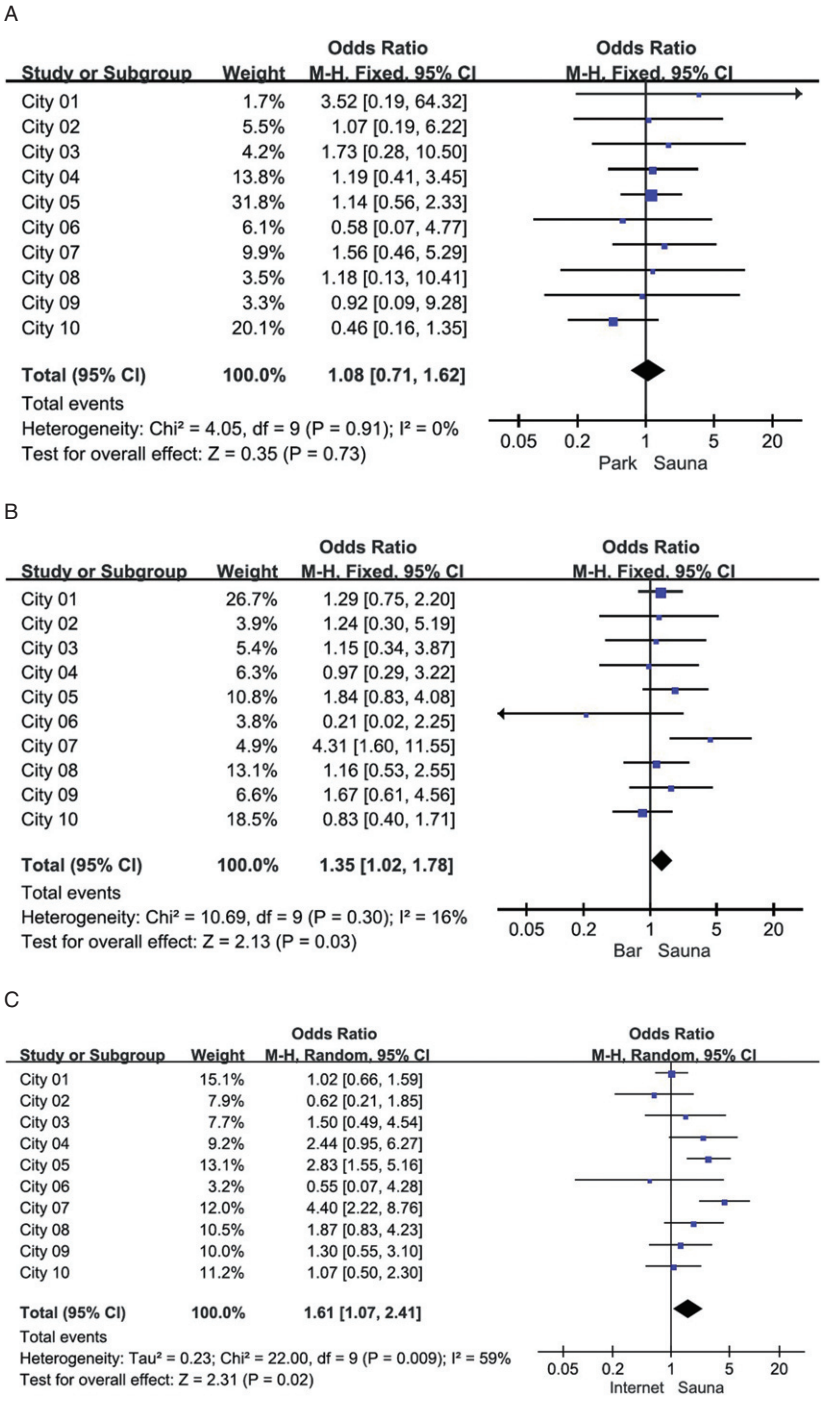

Figure 2 Meta-analysis on the associations between type of venue mainly used by MSM in China to source male sex partners and prevalence of syphilis. (A) Sourcing mainly via saunas vs. mainly sourcing via parks. (B) Prevalence of syphilis among saunas and bars. (C) Sourcing mainly via saunas vs. mainly sourcing via Internet. (D) Sourcing mainly via parks vs. mainly sourcing via bars. (E) Sourcing mainly via parks vs. mainly sourcing via Internet. (F) Sourcing mainly via Internet vs. mainly sourcing via bars.

Pairwise comparisons of syphilis prevalence by venue type gave results that were similar to the case of HIV prevalence. Participants sourcing male sex partners mostly from saunas had a higher syphilis prevalence as compared with those who did so from bars (OR = 1.35, 95% CI = 1.02–1.78) or via the Internet (OR = 1.61, 95% CI = 1.07–2.41), and participants sourcing partners mostly from parks had higher syphilis prevalence as compared with those who did so via the Internet (OR = 1.55, 95% CI = 1.12–2.15), while the other pairwise comparisons were statistically nonsignificant (Figure 2).

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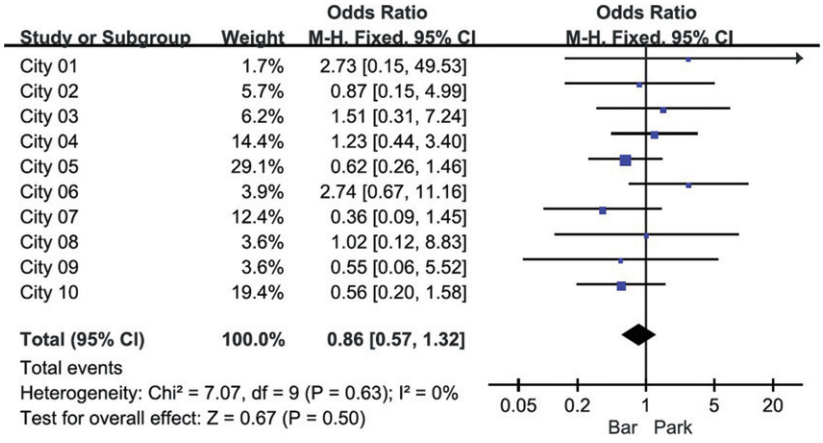

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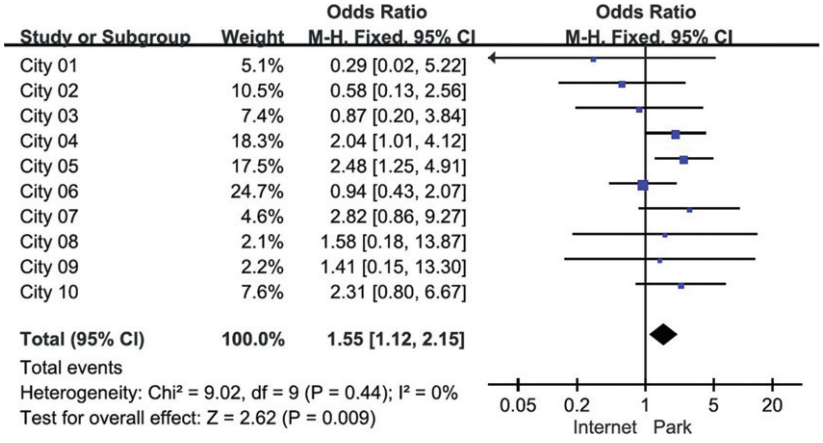

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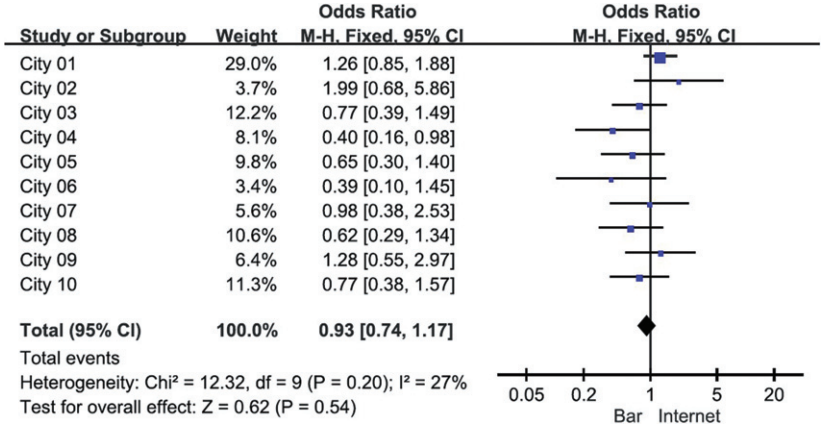

Figure 2 Continued.

Discussion

The results of this study suggest that those sourcing male sex partners mostly from saunas in the 10 cities in China were at higher risk of contracting HIV and syphilis, as compared with those from gay bars or the Internet. In most of the pairwise comparisons, the tests for heterogeneity were not statistically different, suggesting that the associations of the individual cities follow a consistent direction. The findings have important policy and programming implications. Venue-based interven-

tions should be designed and implemented, and sauna-based interventions are urgently warranted.

Many of associations within individual cities did not reach statistical significance, possibly due to the small sample sizes. For instance, when saunas were compared to bars as venue types for partner sourcing, only city 01 gave a significant OR, while the result obtained from the meta-analysis was statistically significant. Methodologically speaking, it is a reminder that statistically negative results obtained from HIV and STD prevalence surveys targeting MSM in China should be interpreted with extreme caution, as the usual sample size of 200–500 [5,27] might not have an adequate power for detecting significant differences. The use of meta-analysis therefore contributes to an understanding of the HIV epidemic in China.

It is relatively good news that although the Internet was the modal source of partner recruitment (about 60% in this study), the source was associated with a lower HIV/syphilis prevalence as compared to saunas ("saunas" vs. "Internet": OR = 2.27 and 95% CI = 1.65–3.12 for HIV, OR = 1.61 and 95% CI = 1.07–2.41 for syphilis) and also with a lower syphilis prevalence as compared to parks (OR = 1.55, 95% CI = 1.12–2.15). Previous studies reported that participants recruited from the Internet have higher HIV prevalence as compared with those recruited from other sources. Our study gives a clarification to that conclusion. Internet-based survey participants may source their sex partners from different types of venues. Therefore, data comparing recruitment via different types of venues may not represent the risk levels associated with male sex partners being recruited from different types of venues, and conclusions from such studies comparing sources of respondent recruitment should be interpreted with care.

Although only 14.18% of the sampled MSM sourced male sex partners mostly from gay saunas, their condom-use behaviors would have a high impact onto the HIV epidemic among MSM in China, as their risk of contracting HIV and syphilis was higher than those mostly sourcing sex partners from the Internet and from bars. Patrons of gay saunas may visit gay saunas frequently and they may visit multiple saunas within the same time period large, intensive, and overlapping sexual networks are therefore created by sauna goers. Some of these sauna goers may also source sex partners from other venues, further extending their sexual networks. Studies investigating the structure of sexual networks among MSM are warranted in China [4,31].

There are reasons why gay saunas in China are conducive to HIV transmissions. Previous studies showed that factors including condom availability, lack of communication, and physical settings were associated with UAI within gay saunas [24,32,33]. Ecology is an important element of health promotion [34,35]. Saunas, unlike hotels or private rooms, do not provide a reasonable setting for practicing protected sex. For instance, sex actions may take place spontaneously in shower rooms where MSM are naked, making it harder for them to practice protected sex. Detailed research about detailed ecological, social, and cognitive factors contributing to UAI in saunas in China is urgently required.

It has been found that unlike bars and the Internet, parks as a venue for partner sourcing was not statistically different from saunas in terms of HIV/syphilis prevalence. Sourcing partners from parks were also at higher risk of syphilis infection than sourcing partners from the Internet. Parks may fall between saunas and bars or the Internet in terms of risk. Sourcing sex partners from saunas and parks, as distinct from bars and the Internet, usually involves sexual behaviors on-site and soon after the identification of the sex partner. The environments (e.g., darkness) may be conducive to UAI. Socio-ecological factors are important in determining UAI among MSM.

Ensuring condom availability is a logical step to strengthen HIV prevention in China. However, although sauna-based outreach work and condom distributions are available in some of the cities that were involved in this meta-analysis, condom supply to saunas in China might not be regular. Condoms found in the saunas might be used as evidence in police prosecution; hence, vending machines are hence not installed in gay saunas in China. A study found that 23.7% male sex workers serving men in China who practiced UAI during unprotected sex mentioned the non-availability of condoms as the reason for having the UAI [36]. Sauna-based condom-use promotion is therefore greatly warranted. Coordination between HIV prevention workers and the public security forces need to be enhanced.

In public health, removal of the source of infection is a commonly used method for controlling emerging infectious diseases. Animals were removed from wet markets to control severe acute respiratory syndrome (SARS) and avian "u [37], and schools were closed to control human swine "u [38]. This is, however, not the case regarding gay saunas in China, which have been shown to have a potentially important role in HIV/STD

transmissions. It is arguable whether gay saunas in China should be shut down. Such a measure would damage the relationship between HIV workers and stakeholders such as gatekeepers and MSM clients. HIV workers may argue that closure of saunas would make MSM even "harder-to-reach," as they approach MSM for HIV prevention mainly through venues such as gay saunas. A nation-wide open debate may be necessary to facilitate policy making.

The prevalence of HIV antibody testing among MSM in China was low [2]. Many HIV-positive sauna users are unlikely to be aware of their infection status and continue to spread the virus to other sauna users unintentionally via UAI. Some sauna-based HIV and STD programs exist, but the intensity and coverage of such testing programs are far from ideal. However, previous studies show that many HIV-positive MSM continue to have UAI in saunas [24,39]. Therefore, even high coverage of testing may not be able to stop HIV transmission in gay saunas.

In international literature, no similar meta-analysis had been conducted. Previous studies have, however, compared the HIV prevalence of the participants sampled from different venues [3,40,41]. Some of these reported that participants sampled from gay saunas have higher HIV prevalence as compared with those sampled from other venues such as gay bars and gay clubs [21,28]. No direct comparisons are possible as this study is unique in considering the key venue for sourcing male sex partners, rather than venues for the recruitment of the study participants.

The findings are subject to some limitations. Because we are comparing different combinations, the results may be subjected to multiple comparison effects. Applying Bonferroni adjustment to the data would mean that we should reject the null hypothesis of no difference only when the *P* value is lower than about 0.0083. The significant results from the comparisons of HIV prevalence between the cases of saunas vs. bars and saunas vs. Internet remained significant, although the comparisons of syphilis prevalence would not meet this stringent adjustment. Another important limitation of the study was related to the way of asking the question about venues of sourcing male sex partners. Participants were requested to give a single answer of the most frequently used venue for sourcing male sex partners. For some participants, there might be two equally frequently used venues. Multiple venues could have been used but the role of the other venues could not be analyzed as such information was not available in the surveys of this meta-analysis. Furthermore, the 10 cities did not cover the whole of China although efforts have been made to cover different parts of China. We need to pay attention to the representativeness of the 10 cities when interpreting the results. Gay saunas exist in almost all 61 cities and are important venues for sourcing male sex partners among MSM all over China. Even the 61 cities could not truly represent the entire China, especially the smaller cities and towns. The 10 cities covered a large population (over 8% of the national population). The results are hence important but they may overrepresent the larger cities in China.

In sum, attention should be paid to those MSM sourcing male partners from gay saunas. Information about the high risks involved in UAI taking place in gay saunas, such as those obtained from this meta-analysis, should be disseminated to stakeholders of the MSM community in China.

Conclusions

This study is the first of its kind in China to investigate the associations between HIV/syphilis prevalence and the type of venue mostly used for sourcing male sex partners by MSM using a meta-analytic approach. Findings from this study clearly show that those sourcing partners mainly from gay saunas have higher prevalence of HIV/syphilis as compared with those doing so via the Internet or gay bars. Sauna-based interventions using socio-ecological approaches are greatly warranted to reduce HIV and syphilis prevalence among MSM in China.

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Category 3

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