

Men who have sex with men in China have relatively low numbers of sexual partners

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Abstract

HIV prevalence is increasing rapidly among men who have sex with men (MSM) in China and potentially associated with the number of male sexual partners that each man has on average. This study estimates the distribution of the number of male sexual partners among Chinese MSM through a comprehensive review of English and Chinese published literature. The overall median number of male sexual partners of Chinese MSM in the past 6 months China was estimated to be 1.5 (95% CI, 1.1-1.8) and 3.8 (95% CI 1.5-6.9) sexual partners in the past 6-month and 12-month periods respectively. An estimated 31% of sexual partners of MSM in China are regular partners, 54% are casual partners, and 16% are commercial partners. The reported numbers of sexual partners has not changed over time during the past decade. The numbers of male sexual partners reported by Chinese MSM is consistently lower than other settings and may not be sufficient to explain the recent rapid increase in HIV prevalence.

Introduction

There are an estimated 5-10 million men who have sex men (MSM) in China.¹ MSM in China are a population group at increasing risk for HIV infection. A recent national report revealed that the proportion of new HIV annual infections due to homosexual exposure has increased from 12-33% over the past 3 years, 2007-2009.² Estimated HIV prevalence among MSM in China has increased from 1.4-5.3% during 2001-2009.³

HIV transmission is strongly associated with levels of engaging in risk behaviors.⁴ Behavioral surveillance of risk factors associated with HIV is valuable for identifying targets for public health efforts. There are limited systems in place for collecting routine behavioral surveillance data for at-risk populations in China, particularly for MSM. Currently China has 1029 national HIV sentinel surveillance sites,⁵ but only 56 specifically targeted

MSM.⁶ There is considerable diversity in the risk behaviors engaged in by Chinese MSM, including their condom usage, number of sexual partners and frequency of sexual acts. Thus, not only is it important to estimate average levels of risk but also to obtain knowledge of the distribution of behaviors across the population. A comprehensive literature review over all available published studies is a valuable way of collating information to estimate the overall level of risk behaviours in the population. In this study we estimate the distribution of numbers of male sexual partners among Chinese MSM through a literature review of both English and Chinese published journal articles during 2000-2010.

Materials and Methods

We conducted a review of published articles in the following Chinese and English electronic databases: PubMed, Chinese Scientific Journals Fulltext Database, China National Knowledge Infrastructure (CNKI) and Wanfang Data (Figure 1). Keywords used in the search included (HIV or AIDS, sexual behavior or risk behavior) and (homosexual or gay or bisexual or Tongzhi, Chinese term referring to homosexual men) or (men who have sex with men or MSM) and China. Studies published during 2000-2010 were included if they reported numbers of male sexual partners in the last six or twelve months with at least 3 partner sub-categories and information about the study (year, location and sampling size). Data from all studies were collated and categorised according to types of sexual partnerships where possible (regular, non-commercial casual, commercial, and unspecified). The literature search was performed by two investigators (EPFC, LZ) independently and the search results were then compared. The two investigators discussed to resolve any differences in the research results and undetermined publications were decided by the third investigator (DPW).

Lognormal distributions represent probability distributions of a random variable whose logarithmic values are normal distributed and have been accepted as a good approximation to the distribution of sexual partners of human populations.⁷ We hence fitted cumulative lognormal distributions to the cumulative numbers of sexual partners from collated studies. 95% confidence intervals (CI) were generated by 100 repeated bootstraps on the fitted curves. We investigate the temporal trend of number of sexual partners of MSM in the past 10 years using the Spearman non-parametric correlation test ($P < 0.05$ indicates statistically significant trend).

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Key words: HIV, men who have sex with men, review, China.

Acknowledgements: the authors acknowledge funding from the Australian Research Council and the University of New South Wales. The Kirby Institute for infection and immunity in society is funded by the Australian Government, Department of Health and Ageing. The views expressed in this publication do not necessarily represent the position of the Australian Government. The Kirby Institute for infection and immunity in society with the Faculty of Medicine at the University of New South Wales.

Conflict of interest: the authors report no conflicts of interest.

Received for publication: 29 April 2011.

Revision received: 3 June 2011.

Accepted for publication: 8 June 2011.

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Infectious Disease Reports 2011; 3:e10
doi:10.4081/idr.2011.e10

Results

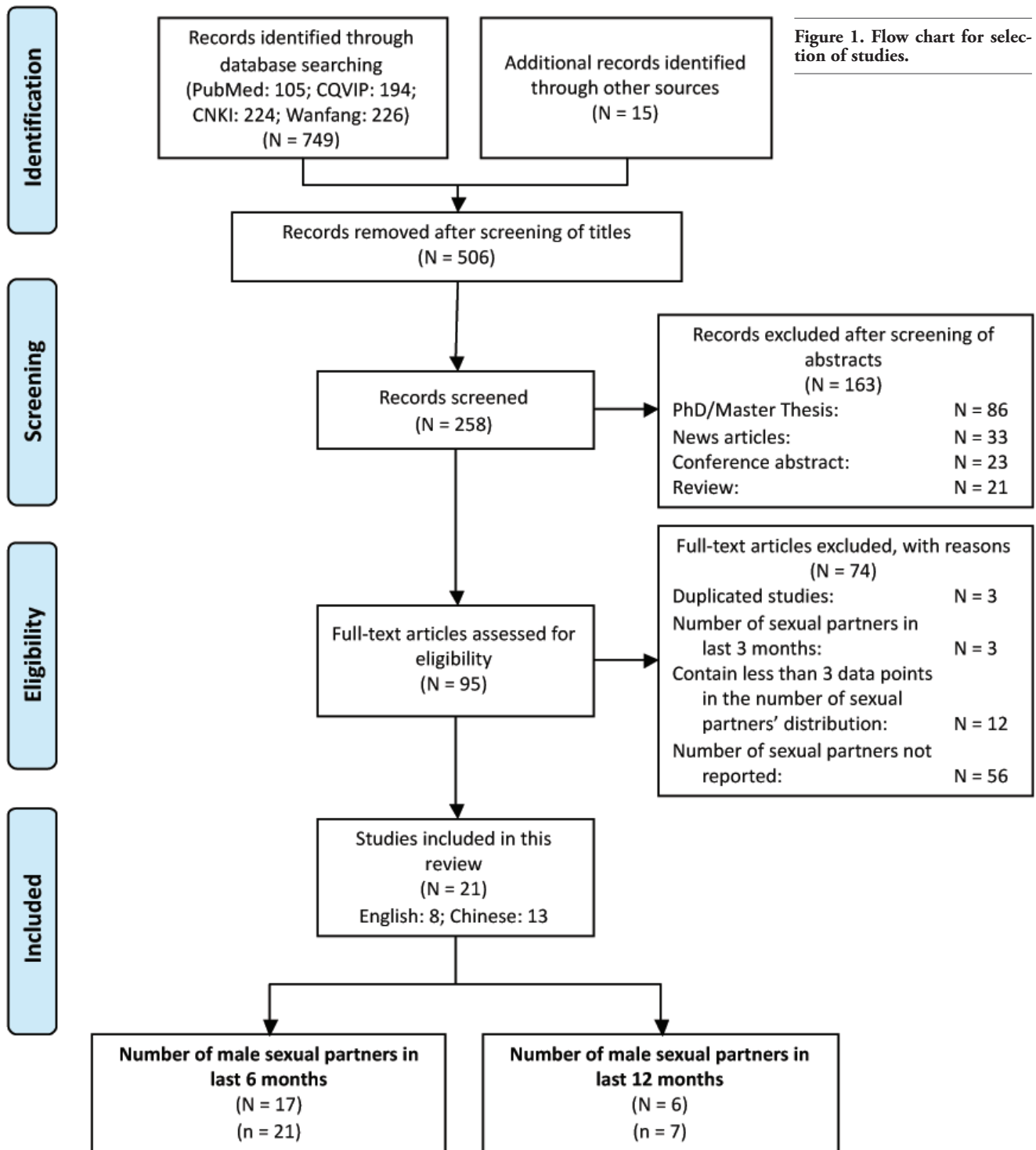
We identified 749 articles from four electronic databases (105 in PubMed, 194 in CQVIP, 224 in CNKI and 226 in Wanfang), we also identified 15 articles from reference lists of published articles. We removed 506 articles due to duplication records in other databases and unrelated title. The remaining 258 articles were screened and we further excluded 163 articles after screening of abstracts (86 were non peer-reviewed theses, 33 were news articles, 23 were conference abstract and 21 were review articles). The remaining 95 articles were eligible for full-text screening, we excluded 74 articles at this stage (3 were duplicated studies; 3 reported number of sexual partners in last three months; 12 contained less than three data points in the number of sexual partners' distribution and 56 did not report the number of sexual partners among MSM). Finally, there were 21 eligible articles (8 in English and 13 in Chinese) included in this study. A flow chart of study selection is shown in Figure 1. We identified 17 and 6 studies that reported on the distribution of number of male sexual partners of MSM in the past 6 and 12

months, respectively, during 2000-2010 (Table 1). There was no statistical association between the estimated mean/median number of sexual partners and calendar year of the studies (*Spearman*, $r=-0.13$, $P=0.58$ and $r=-0.12$, $P=0.63$ for mean/median numbers in past 6 months; $r=-0.26$, $P=0.57$ and $r=-0.11$, $P=0.84$ for mean/median number in past 12 months, respectively). As no temporal trends of number of partnerships were observed, data from all

studies were pooled for subsequent analysis.

According to Figure 2, the overall median number of male sexual partners of Chinese MSM in the past 6 months was estimated to be 1.5 (95% CI, 1.1-1.8); approximately 7.8% (95% CI, 5.3-11.3%) of Chinese MSM reported having more than 10 sexual partners in the past 6 months. The mean average number of sexual partners for MSM in China in the past 6 months was estimated to be 3.7 (95% CI, 3.1-

4.3). For studies that reported numbers of partners over the last 12 months, half of MSM stated that they had more than 3.8 (95% CI 1.5-6.9) sexual partners and 28% (95% CI, 16-40%) had more than 10 sexual partners. The mean number of male sexual partnerships for MSM in China in the last 12 months was found to be 13 (95% CI, 8-19). Out of 21 studies, only two reported a distribution of number of sexual partners according to different types of part-



nerships (Table 1).^{8,9} Based on these data, we estimate that 31% of sexual partners of MSM in China are regular partners, 54% are casual partners, and 16% are commercial partners.

Discussion

MSM in China have substantially fewer sexual partners than reported in numerous developed countries. Studies have reported that 37-42% MSM in Australia, USA and Western European countries have more than 10 sexual partners in the past 6 months,¹⁰⁻¹⁶ approximately 5-fold greater than in China. The number of partners reported by MSM in China is

also 1.5-4 times fewer than reported in other developing countries such as Brazil and India.¹⁷⁻¹⁹ Only reports from countries in Africa,^{20,21} Eastern Europe²² and neighbouring Asian countries that are traditionally influenced by Chinese culture²³⁻²⁵ suggest comparable numbers of sexual partnerships among MSM. This could be due to similar conservative social structures or a tendency to under-report by study participants.

Approximately one-in-three sexual partnerships among MSM in China is a regular partnership, and only approximately 16% Chinese MSM have engaged in commercial sex in the past 6 months. These data suggest that most Chinese MSM are relatively conservative with regards to sexual mixing and the majority of

male sexual intercourse for Chinese MSM takes place in regular partnerships. However only 19.9% of MSM had consistent condom use with their regular male sexual partners in last six months, which is the lowest condom use rate in comparison with commercial partners (58.0%) and non-commercial casual partners (60.4%).²⁶

Several limitations should be noted. First, 19 out of 21 studies reported the overall numbers of male sexual partners without specific information about types of sexual relationships. The proportion of MSM who had sex with regular, commercial and non-commercial male sex partners was estimated based on two studies only.^{8,9} Second, 15 out of the 21 selected studies recruited MSM from MSM venues,

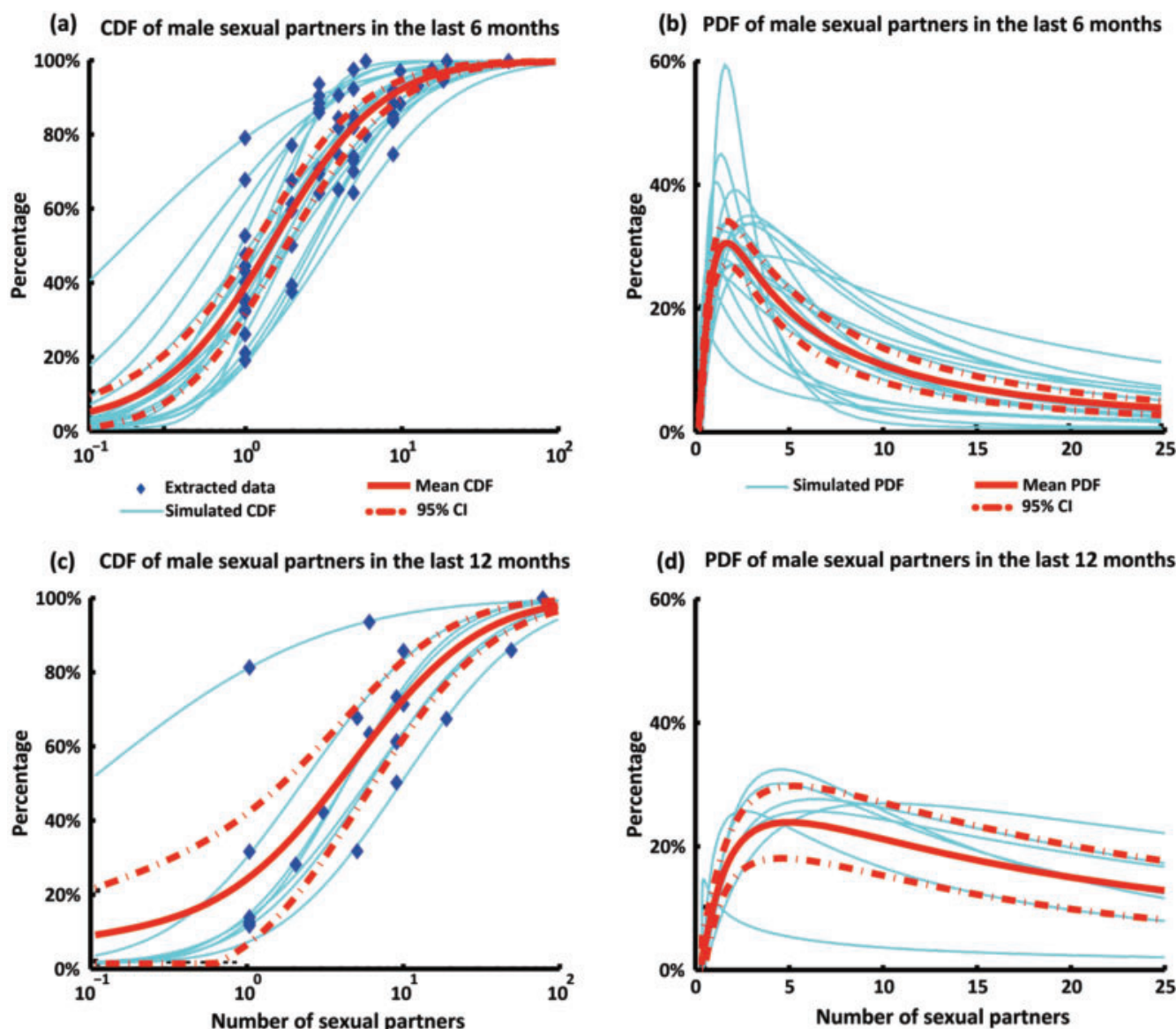


Figure 2. Cumulative distribution function and the deduced probability density function of number of male sexual partners of MSM in China in the past 6 and 12 months.

Table 1. Study information and estimated mean and median number of sexual partners in the past 6 and 12 months.

First author published year	Study period	Study location	Age range (Mean)	Recruitment method	Study design	Sampling method [†]	Surveyed period*	Types of partnerships	Sampling size	Number of sexual partner	
										Mean	Median (95% CI)
Choi KH, 2004 ³⁰	2001-2002	Beijing	18-69 (27)	MSM Venues	MSM	Snowball and convenience	P6M	Unspecified	482	5.3	2.7 (0.3-26.9)
Mao M, 2008 ³¹	2003	Sichuan	16-76 (28)	MSM Venues	MSM Venues	Random	P6M	Unspecified	491	6.1	3.0 (0.3-32.1)
Ma X, 2007 ³²	2004	Beijing	≥18	MSM network	MSM network	RDS	P6M	Unspecified	325	3.4	1.7 (0.2-18.1)
Choi KH, 2007 ³³	2004-2005	Shanghai	18-56 (28)	MSM Venues	MSM Venues	Snowball	P6M	Unspecified	477	3.0	1.4 (0.1-16.3)
Li X, 2008 ³⁴	2005	Beijing	17-54	MSM Venues and website advertisements	MSM Venues and website advertisements	Multiple	P6M	Unspecified	526	5.5	1.8 (0.1-35.9)
Zhu JL, 2007 ³⁵	2005	Hefei	18-29 (20)	Peer-referral, website advertisements	Peer-referral, website advertisements	RDS	P6M	Unspecified	122	1.5	0.9 (0.1-6.8)
Li N, 2007 ³⁶	2006	Henan	17-68 (28)	MSM Venues	MSM Venues	N/A	P6M	Unspecified	160	5.3	2.6 (0.2-27.9)
Sun ZX, 2007 ³⁷	2006	Zhejiang	15-60+	Website advertisements	Website advertisements	N/A	P6M	Unspecified	43	1.8	1.2 (0.2-7.0)
Feng L, 2009 ³⁸	2006	Chongqing	N/A	MSM Venues	MSM Venues	Venue-based and cruising area-based convenience	P6M	Unspecified	1000	2.8	1.2 (0.1-15.9)
Ma X, 2007 ³²	2006	Beijing	≥16	MSM network	MSM network	RDS	P6M	Unspecified	540	9.5	3.5 (0.2-59.3)
Chen SH, 2008 ³⁹	2006	Nanning	18-45	MSM who visited CDC for health counseling	MSM who visited Nanning CDC for health counseling	Peer-referral	P6M	Unspecified	185	1.8	0.7 (0.0-11.0)
Wang Y, 2008 ⁸	2006-2007	Mianyang	16-57	MSM Venues	MSM Venues	RDS	P6M	Regular Causal Commercial	201	1.5	1.2 (0.3-4.5)
Feng Y, 2010 ⁹	2007	Chengdu	16-44	MSM community	MSM community	Snowball	P6M	Causal	512	1.7	0.7 (0.1-10.3)
Zhou J, 2008 ⁴⁰	2007	Guiyang	15-49 (24)	MSM Venues	MSM Venues	N/A	P6M	Unspecified	255	0.8	0.4 (0.1-4.7)
Liu H, 2009 ⁴¹	2007	Shenzhen	18-45	MSM Venues	MSM Venues	RDS	P6M	Unspecified	351	3.6	1.3 (0.1-22.9)
Feng L, 2009 ³⁸	2007	Chongqing	N/A	MSM Venues	MSM Venues	Venue-based and cruising area-based convenience	P6M	Unspecified	1044	1.8	1.4 (0.4-5.5)
Liang L, 2009 ⁴²	2008	Hebei	N/A	MSM who visited CDC for HIV voluntary counseling and testing	MSM who visited CDC for HIV voluntary counseling and testing	SBS	P6M	Unspecified	450	6.1	2.0 (0.1-39.5)
Zhao H, 2009 ⁴³	2008	Harbin	17-52 (25)	MSM who visited CDC for HIV voluntary counseling and testing	MSM who visited CDC for HIV voluntary counseling and testing	VDT	P6M	Unspecified	89	3.8	1.1 (0.0-25.7)
Zhou SJ, 2008 ⁴⁴	2008	Chongqing	16-59 (30)	MSM Venues	MSM Venues	N/A	P6M	Unspecified	339	4.6	1.9 (0.1-26.9)
Gu Y, 2004 ⁴⁵	2003	Shenyang	16-49	MSM Venues	MSM Venues	N/A	P12M	Unspecified	333	3.3	1.9 (0.3-14.9)
Cai WD, 2005 ⁴⁶	2004	Shenzhen	17-58 (26)	MSM Venues	MSM Venues	N/A	P12M	Unspecified	218	7.4	2.3 (0.1-49.5)
Ma X, 2007 ³²	2005	Beijing	≥16	MSM network	MSM network	RDS	P12M	Unspecified	427	29.2	9.9 (0.5-187.8)
Chen SH, 2008 ³⁹	2006	Nanning	18-45	MSM who visited Nanning CDC for health counseling	MSM who visited Nanning CDC for health counseling	Peer-referral	P12M	Unspecified	185	19.4	5.9 (0.3-129.6)
Cai YM, 2008 ⁴⁷	2006	Shenzhen	18-53 (27)	MSM Venues	MSM Venues	Venue-based	P12M	Unspecified	458	3.8	0.1 (0.0-21.4)
Ma X, 2007 ³²	2006	Beijing	≥16	MSM network	MSM network	RDS	P12M	Unspecified	540	10.1	4.2 (0.3-58.8)
Ruan S, 2008 ⁴⁸	2007	Jinan	N/A	MSM network	MSM network	RDS	P12M	Unspecified	428	17.2	6.1 (0.3-108.6)

[†]RDS, Respondent-driven sampling; *P6M, Past 6 months; P12M: Past 12 months.

which may potentially participate in higher risk sexual activities²⁷ in comparison with MSM recruited via other sampling methods. This may not be representative of the sexual behaviours of the overall MSM population and further investigation into the differences in number of sexual partners due to different sampling methods is required. Third, all the studies were obtained from surveys of self-reported sexual behaviours. Reporting bias, survey consistency, reliability and validity are possible factors contributing to variations across these studies. Fourth, all collated studies reported the number of male sexual partners in major urban cities of China but not in rural regions. However, MSM from rural background are likely to have different education levels, perspectives regarding sexual orientations and sexual behaviors.

The consistently relatively low number of sexual partnerships may not be sufficient to explain the rapid increase of HIV prevalence among MSM in China. Other high-risk sexual behaviours, such as low condom use,²⁸ practice of group sex and low testing coverage²⁹ may all contribute to the rapid transmission of HIV and other sexually transmissible infections among Chinese MSM. Scaling up prevention efforts should focus on health education about HIV/AIDS and sexually transmissible infections as well as condom distribution and regular HIV/STI testing to curb the further spread of these infections among MSM in China.

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