

# Survey for HIV Infection Rate and Influencing Factors among MSM

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## Abstract

**Purpose:** Understand the HIV infection rate and relevant knowledge, attitude, behavior and access to health services among men who have sex with men (MSM) to provide evidence for HIV/AIDS prevention and control. **Methodology:** Questionnaire survey was conducted to understand HIV/AIDS knowledge, attitude, behavior and access to health services among MSM. Serological testing was performed to look at HIV, syphilis and HCV infection rates. Epi Data 3.2 was used to create a database and SPSS 17.0 was used for statistical analysis. **Results:** A total of 58.50% of subjects identified themselves as homosexuals; 28.20% of subjects gave correct answers to all HIV/AIDS-related questions; 81.57% of subjects had sex with different males in the past six months; 25.53% of subjects used condoms at anal sex with males in the past six months; HIV infection rate was 1.27%; syphilis infection rate was 6.22%; and HCV infection rate was 0.88%. **Conclusions:** MSM in Shandong Province have strong sense of self-identify, but they have poor knowledge of HIV/AIDS, many irregular sexual partners and low condom use rate. Moreover, some MSM use drugs at the same time.

**Keywords:** MSM (Men who have sex with men); HIV/AIDS

## Introduction

Acquired immunodeficiency syndrome (AIDS) is an infectious disease closely linked with human behaviors [1,2]. Over the past years, HIV infection rate among MSM has been on an increase in China. Same sex behavior among males (mainly anal and oral sex) has become one of the primary routes of HIV transmission [3,4]. According to national reports on HIV/AIDS epidemics, HIV/AIDS cases transmitted via same sex behavior accounted for 2.5% of the total number of reported cases in 2006, but the proportion increased to 28.3% in 2015 [4]. A survey was conducted for 57,407 MSM in 61 cities from 2008 to 2009, indicating an average HIV infection rate of 4.8%. Specifically, the HIV infection rate was over 10% in southwestern cities (e.g. Guiyang, Chongqing, Kunming and Chengdu), about 7% in eastern cities and 4-5% in coastal cities and some northeastern cities, with the highest rate of 18%. National HIV sentinel surveillance results showed that HIV infection rate was higher than 1% in all cities and on a rapid increase year by year. HIV transmission among MSM has become one of the major factors fuelling the epidemic [4]. The Ministry of Health of the People's Republic of China, Joint United Nations programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) conducted a joint estimation of HIV/AIDS epidemic in China. MSM accounted for 12.2% of 50,000 new HIV/AIDS cases in 2007, 32.5% of 48,000 HIV/AIDS cases in 2009 and 29.4% of 48,000 HIV/AIDS cases in 2011 [4-6]. Shandong Province has a low HIV prevalence (i.e. 2.4/100,000). Since the first human immunodeficiency virus (HIV) case was detected in 1992, the major routes of HIV transmission were illegal blood collection/supply and spousal heterosexual contact by 2005. Since 2006, male homosexual contact has caused an increasing proportion of reported HIV/AIDS cases, with the proportion reaching 67.9% in 2015, which exceeded the proportion of cases via heterosexual (38.0%). To understand HIV/AIDS knowledge, attitude, behavior and access to health services among MSM and their STI/HIV infection rates in Shandong Province of P.R. China, we conducted a survey in eight cities (including Jinan and Qingdao) in the province from August to December 2015.

## Materials and Methods

**Subjects:** Subjects were men who have sex with men (MSM), mainly including homosexual men and men who denied their

homosexual orientation but had sex with males. All survey sites had good performance in HIV/AIDS response, established effective working networks, provided convenience for special surveys and were representative in terms of economic development and geographical location.

**Methods:** Health Survey Questionnaire for MSM in Shandong Province was used to conduct one-to-one survey by trained investigators under the principles of informed consent and voluntariness, in a bid to understand the awareness of HIV/AIDS among subjects, high risk behaviors, STI infections, health-seeking behaviors and access to HIV/AIDS-related prevention services. Methods, procedures and criteria for HIV, syphilis and HCV tests were based on the National Technical Specifications for HIV Testing and instructions of reagents. Rapid kits produced by ACON Biotech (Hangzhou) Co. Ltd. was used for HIV antibody test; enzyme-linked immunosorbent assay (ELISA) reagents produced by Zhuhai LIVZON Diagnostics Co., Ltd. were used for retesting; and HIV1+2 western blotting (WB) reagents produced by Singapore Genelabs were used for confirmatory test of positive samples. Reagents produced by Dalian Fanbang Chemical Technology Development Co. Ltd. were used for rapid plasma regain test (RPR) during syphilis screening; and treponema pallidum particle agglutination test (TPPA) was used for confirmatory test. Antibody diagnostic kits produced by Shanghai Kehua Bio-engineering Co., Ltd. were used for HCV test. All reagents were used before the expiration date. Serological testing was performed by trained technicians of the AIDS Confirmatory Laboratory of Shandong CDC.

**Statistical analysis:** Epi Data 3.2 was used to create a database. Data were entered, summarized and collated. SPSS 17.0 was used for statistical analysis.

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## Results

### General information

A total of 1,625 subjects were surveyed. 1,617 valid questionnaires were collected, with a qualification rate of 99.51%. The average age of 1,617 subjects was 26.45 years. 71.90% were married; 24.60% were single; 2.10% lived with partners; and 1.40% were divorced or bereaved of spouse. 88.20% were local residents and 11.80% were migrants. 98.90% were Han people. 58.60% had an education level of junior college and above; 27.00% had an education level of senior high school/technical school; 12.20% had an education level of junior high school; 1.60% had an education level of primary school; and 0.60% were illiterate. 25.30% were students; 15.20% were commercial employees; and 15.00% were from other occupations, of which more than 50% were businessmen, company employees and freelancers.

### Awareness of knowledge about HIV/AIDS

A sum of 28.20% of subjects gave correct answers to all HIV/AIDS-related questions; 72.11% of subjects gave correct answers to three effective routes of HIV transmission; and 34.94% of subjects gave correct answers to noneffective routes of HIV transmission (Table 1).

### Self-identification and testing

A total of 58.50% of subjects reported they were homosexual; 30.60% reported they were bisexuals; 7.00% reported they had uncertain sexual orientation; 2.00% reported they were heterosexuals; and 1.90% refused to answer the question.

Only 30.18% of subjects received HIV test over the past year, of which 92.42% knew results and 7.58% did not know results.

### HIV/AIDS-related high risk behaviors

**Sexual behaviours:** Total of 90.23% of subjects reported the age of their sexual debut. The average age was 19.91 years. 68.09% of subjects had their sexual debut with a male. 77.23% of subjects reported the age

of their first sex with males. The average age was 23.44 years, ranging from 14 years to 48 years. 81.57% of subjects had sex with different males in the past six months, with an average number of 10.07 male partners. 5.60% of subjects paid males for sex in the past six months, with an average number of 13.85 male partners. 8.87% of subjects received money via sex with males in the past six months, with an average number of 65.04 male partners. 21.77% of subjects had sex with females in the past six months, with an average number of 1.46 female partners and the largest number of 12 female partners (Table 2).

**Drug use:** Eight subjects reported drug use, and three subjects reported injecting drug use in the past six months. All subjects refused to answer the question on needle sharing in drug injection. For the question on frequency of needle sharing in the past six months, two subjects reported "Never" and other subjects refused to answer the question.

**Condom use:** The rate of condom use at last sex with both male and female was lower than 50%. The rate of consistent condom use with both males and females in the past six months were lower than 30% (Tables 3 and 4).

**STIs and health-seeking behaviors:** An aggregate 14.50% of subjects had STI-related symptoms (including painful urination or urine burning, abnormal urethral discharge, lesions, ulcer or hyperplasia on genital skin or membrane, etc.), of which 44.87% resorted to specialized STI clinics, 23.50% resorted to general hospitals, 17.52% self-medicated, 15.38% selected private clinics, 7.69% did nothing or refused to answer the question, and 0.43% selected other options.

**Access to HIV/AIDS prevention services:** All subjects accessed HIV/AIDS prevention services in the last year. Specifically, 70.32% of subjects received STI/HIV IEC materials (e.g. booklets and leaflets) and 67.66% received condoms (Table 5).

**Laboratory testing:** A total of 1,415 blood samples were collected, accounting for 87.51% of subjects. Laboratory testing detected 18 HIV-positive cases, with an infection rate of 1.27%. There were 88 syphilis

Question	Yes	No	Don't know	Percent (%)
Can we know just by looking if a person has been infected by HIV?	954	497	166	59
Can a person get the HIV virus by transfusing HIV infected blood or blood products?	1524	25	68	94.25
Can a person get the HIV virus by sharing needles with PLHA?	1516	36	65	93.75
Can correct condom use at each sex reduce the risk of HIV transmission?	1437	73	107	88.87
Can having sex with only one partner who is not HIV-infected reduce the risk of HIV transmission?	1318	151	148	81.51
Can a pregnant woman infected with HIV transmit the virus to her unborn child?	1442	78	97	89.18
Can a person get the HIV virus by eating with PLHA at the same table?	240	1288	89	79.66
Can a person get the HIV virus from mosquito bites?	513	970	134	59.99

Table 1: Awareness of knowledge about HIV/AIDS.

Question	Yes	No	Refuse	Percent (%)
Did you have anal sex with males in the past six months?	1319	242	56	81.57
Did you pay males for sex in the past six months?	77	1266	32	5.6
Did you receive money via sex with males in the past six months?	122	1222	31	8.87
Did you have sex with females in the past six months?	352	1239	26	21.77

Table 2: Incidence of high risk behaviors.

Question	Yes	No	Refuse	Percent (%)
Did you use a condom at last anal sex with a male?	672	606	97	48.87
Did you use a condom at last sex with a paid male?	50	37	22	45.87
Did you use a condom at last sex with a paying male?	137	1268	62	45.75
Did you use a condom at last sex with a female?	145	189	44	38.36

Table 3: Condom use at last sex.

Question	Never	Sometimes	Every time	Refuse	Percent (%)
Did you use condoms at anal sex with males in the past six months?	207	723	351	94	25.53
Did you use condoms at anal sex with paid males in the past six months?	15	46	31	17	28.44
Did you use condoms at anal sex with paying males in the past six months?	13	81	34	25	22.22
Did you use condoms at anal sex with females in the past six months?	102	170	65	41	17.2

Table 4: Condom use at sex in the past six months.

Service item	Yes	No	Percent (%)
Distribution of condoms	1094	523	67.66
Distribution of lubricants	948	669	58.63
Peer education	446	1171	27.58
STI examination or treatment	307	1310	18.99
STI/HIV counseling	953	664	58.94
Provision of STI/HIV IEC materials (e.g. booklets and leaflets)	1137	480	70.32
TV	969	648	59.93
Radio	508	1109	31.42
Newspaper	734	883	45.39
Books	640	977	39.58
Friends	633	984	39.15
Doctors	252	1365	15.58
Counseling	291	1326	17.8
Free IEC materials	691	926	42.73
Street advertisements	156	1461	9.65
Other	396	1221	24.49

Table 5: Access to HIV/AIDS prevention services.

cases with an infection rate of 6.22%, and 12 HCV cases with an infection rate of 0.88%.

## Discussion

Currently, there are four MSM sentinel surveillance sites in Shandong Province. Prior to this survey, however, there was no large-scale survey on the awareness of HIV/AIDS knowledge among MSM. This survey selected coastal and inland developed, developing and underdeveloped cities. Such a wide geographical coverage could basically reflect the actual situation of HIV/AIDS response among MSM in the province. Survey results indicated that MSM were mostly young, married and well educated. They have strong sense of self-identity for their homosexual orientation, which may be closely linked with their age and education level [7,8].

Most subjects had correct knowledge about three effective routes of HIV transmission, which is consistent with survey results from Kalichman et al. [9,10], but they had poor awareness of noneffective routes of HIV transmission and prevention methods, which may lead to discrimination against people living with HIV/AIDS (PLHA). Therefore, one of the priorities in next steps is to increase comprehensive knowledge about HIV/AIDS prevention and control among MSM. The rate of HIV test in the last year was low among MSM, which may be attributed to inadequate understanding of the importance and necessity of HIV test. IEC should be strengthened to promote HIV test. 80.44% of subjects had sex with different males in the past six months, which is much higher than results from Hallett et al. [11-13] The rate of condom use at sex with both males and females was low among MSM, indicating that knowledge may not necessarily lead to behavior change, which is consistent with results from Choi et al. [14-17] This will fuel STI/HIV transmission among MSM. Survey results also show that some MSM in Shandong Province inject drugs at the same time. Information on harms of drug use should be disseminated to promote the change of risk behaviors among MSM.

STI/HIV infection rates among MSM are increasing in Shandong Province. Fortunately, a large proportion of MSM resorted to specialized dermatovenereology hospitals in case of STI symptoms and some MSM did nothing or selected other options, which is consistent with results from Vanable et al. [18,19] Further efforts should be made to guide MSM to take scientific health-seeking attitudes in future referral services. All subjects accessed HIV/AIDS prevention services in the last year, indicating initial success of HIV/AIDS IEC and behavioral intervention. Nevertheless, traditional mass publicity and condom distribution are still the most popular ways. A variety of channels and forms should be leveraged to strengthen information dissemination and behavior intervention, so as to increase the accessibility and efficiency of HIV/AIDS prevention services.

Although MSM have certain knowledge about HIV/AIDS response and access to HIV/AIDS prevention services, they have poor awareness of safer sex and behavior change and pose a great risk of spreading HIV to the general population. Therefore, it is essential to conduct comprehensive HIV surveillance and strengthen HIV/AIDS prevention among MSM.

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