



# Demographic characteristics of newly diagnosed HIV-seropositive patients: a single-center retrospective analysis

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**Background:** To characterize the HIV-seropositive patients who underwent HIV screening and counseling in a Chinese general hospital and to provide evidence for the HIV/AIDS prevention and control strategy in China.

**Methods:** We retrospectively analyzed data of all the patients who were screened for HIV infection and found to be HIV-positive in our hospital from January 2010 to December 2016. The demographic and social characteristics of the HIV-seropositive patients were described in order to estimate the risk factors.

**Results:** Among 611,445 patients who were screened for HIV, 329 cases were confirmed to be HIV-positive by Western blot test. These patients were predominantly male, accounting for 83.59% (275/329) of cases. Majority of male patients 82.91% (228/275) acquired HIV infection via sexually transmitted route and about 122 male patients (53.51%) were homosexual. The female gender accounted for only 16.41% (54/329) and 77.78% (42/54) of them were infected by a male partner.

**Conclusions:** Our results showed the MSM (men who have sex with men), females and adults over 65 years old have different sexual and psychosocial characteristics and these characteristics should be taken into account for HIV prevention, intervention and treatment when preventative strategies of HIV/AIDS shift from high-risk groups to the general population in China.

**Keywords:** Human immunodeficiency virus; sexually transmitted disease; public policy

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## Introduction

HIV testing in China is primarily performed by general public hospitals, and if found to be positive on screening tests, then is forwarded to Centers for Disease Control and Prevention (CDC) in city of Nanjing to confirm. With the spread of the AIDS epidemic, it was estimated that there were 780,000 individuals living with HIV/AIDS in China (1), and over 50% of these people were unaware of their infection (2). Many of them either were symptomatic

and were screened in a hospital or were blood donors who were tested before blood donations. Hospitals provide HIV testing and counseling for inpatients, surgical patients, pregnant women, or people who need a blood transfusion (3). Hospitals also provide HIV testing and counseling for outpatients in some departments, such as infectious diseases, pulmonary, skin & venereal, gynecology, assisted reproductive, and well-visit clinics. It is of great significance to health policy makers and CDC to understand about these asymptomatic patients living with HIV, for

better engagement and deployment of health policies for AIDS prevention, diagnosis, treatment and control.

To our knowledge, no previous studies have examined experiences associated with HIV testing, such as the proportion of HIV infected population distribution in hospital setting. To fill these gaps, a retrospective study was conducted from January 2010 to December 2016 on the newly diagnosed HIV patients from the First Affiliated Hospital of Nanjing Medical University. This study was designed to examine and compare epidemiological characteristics of the HIV infection in Nanjing, China. Knowledge gained from this study would be useful for developing better strategies for HIV/AIDS prevention and treatment. Our project will be helpful for assessing the magnitude of HIV epidemic and risk behavior patterns in both genders and various age groups.

## Methods

### *Ethics statement*

This observational study received ethical approval from the Ethics Committee at the First Affiliated Hospital of Nanjing Medical University (No. 2017-SR-212), and all clinical investigation have been conducted according to the principles expressed in the Declaration of Helsinki. Need for patients' consents was waived because of retrospective nature of the study. All HIV consent and testing procedures followed relevant Chinese national guidelines (4).

### *Study population and procedure*

HIV screening samples from January 2010 to December 2016 were analyzed. Positively screened samples were confirmed by Nanjing Center for Disease Control and Prevention (Nanjing CDC) (5). These HIV-positive patients were surveyed via a questionnaire to identify and explore their epidemiological, geographical and social data, sexual habits and possible mode of transmission in order to estimate the risk factors. Our institution is a large general hospital (about 4,500 beds) that has various departments and clinics which provide medical care to people of Nanjing and throughout Jiangsu province. These methods were carried out in accordance with the approved guidelines.

### *Statistical analysis*

The statistical software package SPSS17.0 (SPSS Inc., Chicago, USA) was used for data analysis. Statistical

comparisons were used to compare patient gender, age, hospital department, and routes of transmission. For comparisons of differences among groups, the  $\chi^2$  test for categorical variables was used (using Fisher's exact test when appropriate) and the Mann-Whitney test or ANOVA for continuous variable. For all statistical comparisons, a  $P < 0.05$  was considered statistically significant.

## Results

Between January 2010 and December 2016, a total of 611,445 patients from inpatient and outpatient departments and well-visit check-up clinics were first time screened for HIV. Among them, 329 cases were confirmed to be HIV-positive at Nanjing Center for Disease Control and Prevention (Nanjing CDC).

We conducted a cross-sectional analysis of these 329 HIV-positive cases and found that 53 cases were from the Department of Infectious Diseases, 43 cases from pulmonary, 41 cases from skin & venereal, and 31 cases from the emergency department. Some of these patients were seriously ill at the time of admission. Seven of the newly diagnosed cases of HIV died during the study period. One, four and two patients died in the year 2011, 2012 and 2014 respectively.

Analysis revealed heterogeneous age distribution in the cohort age ranging from 5 to 79 years with higher number of younger patients (*Table 1*).

The gender distribution was also significantly different ( $P < 0.05$ ) with males constituting 83.59% (275/329) and females were 16.41% in the cohort (*Table 1*). Females, aged 20 to 74 years, were either married or had a steady sexual partner and, 77.78% (42/54) of them were infected by male sexual partner (*Table 1*). The number of HIV-positive male was 275 in the cohort. About 82.91% (228/275) patients had sexually transmitted infection and 53.51% (122/228) of these patients were homosexual (*Table 1*). Number of patients in age group 17–20 years was eight and all of them were homosexual.

Nineteen patients were more than 65 years old in the male cohort and about 52.63% (10/19) of them had sexually transmitted infection.

## Discussion

Prevalence of HIV in China varies greatly by region and our hospital is in lower overall HIV prevalence area. However, with increasing numbers of people living with HIV/AIDS concentrated in key area populations and an increasing

**Table 1** Demographic characteristics and possible transmission routes of the HIV-Seropositive patients in Nanjing, China, 1.1.2010–12.31.2016 (N=329)

Variables	Female (N=54, 16.41%)		Male (N=275, 83.59%)		Total (N=329)	
	N	%	N	%	N	%
<b>Age (years)</b>						
<12	1	1.85	1	0.36	2	0.61
17–20	1	1.85	8	2.91	9	2.74
21–30	7	12.96	75	27.27	82	24.92
31–40	15	27.78	68	24.73	83	25.23
41–50	12	22.22	64	23.27	76	23.10
51–64	13	24.07	45	16.36	58	17.63
≥65	5	9.26	14	5.09	19	5.78
<b>Marital status</b>						
Married	45	83.33	165	60.00	210	63.83
Unmarried	5	9.26	86	31.27	91	27.66
Widowed or divorced	3	5.56	15	5.45	18	5.47
Unknown	1	1.85	9	3.27	10	3.04
<b>Education</b>						
Primary/illiteracy	28	51.85	33	12.00	61	18.54
Junior/senior high	20	37.04	136	49.45	156	47.42
College or higher	2	3.70	84	30.55	86	26.14
Unknown	4	7.41	22	8.00	26	7.90
<b>Possible transmission route</b>						
Homosexual	0	0.00	122	44.36	122	37.08
Heterosexual	42	77.78	106	38.55	148	44.98
IDU	0	0.00	4	1.45	4	1.22
Blood transfusion	2	3.70	10	3.64	12	3.65
Others or unknown	10	18.52	33	12.00	43	13.07

IDU, injecting drug use.

transmission of diseases especially attributable to life-style, the expanding epidemic of HIV/AIDS is witnessed.

Increasing mortality attributable to HIV is also a major concern which is mainly due to unavailability of effective cure (1). It was estimated that over 50% of people living with HIV/AIDS were unaware of their infection status (2). HIV has a long incubation period, by acting on CD4<sup>+</sup> T lymphocyte, gradually destroys the body's immune system. It can cause a series of opportunistic infection and development of tumor, eventually leading to death (6).

There were seven cases of early deaths in our cohort during the study period. One death occurred in 2011, four in 2012 and two deaths in 2014 in 329 HIV-positive patient. It has been needed to cause enough attention.

Being a syndrome, AIDS displays all kinds of clinical symptoms. One of our patients had oral candida infection for a long time and was being treated in a local hospital but no curative effect. He was then referred to our hospital and was diagnosed to have HIV. This case stresses on the increased need for physician's suspicion and vigilance for

undiagnosed HIV/AIDS specially if symptoms do not improve with standard treatment.

Eighty-three patients (83/275) were in age group 17–30 years old in male HIV patient cohort. More than half of these patients (56.63%) (47/83) had a good education background (degree equivalent to college or more) but majority of them (68/83) had sexually transmitted infection. Moreover, 69.12% (47/68) of these cases were MSM. Eight males aged between 17 and 20 were MSM. The rapid rise of HIV among MSM population in China is due to gradually increasing acceptance of homosexuality and rapidly growing social network of MSM, and meanwhile stigma and discrimination as obstacles to HIV services (7,8). It is important to reduce stigma and discrimination against homosexuality among the general population in the prevention and control of AIDS (9,10). Social media interventions may promote safe sexual behaviors and increase HIV testing acceptance.

Out of 275 male HIV-positive cases, 60.00% (165/275) were married. About 82.91% (228/275) cases had sexually transmitted mode of transmission of HIV, and about 53.51% (122/228) of these patients were MSM. These MSM patients were younger in age and about 80% of these patients were married. Perhaps, due to traditional cultural and family values Chinese MSM either try to hide their sexual orientation or choose to marry a woman to conceal their homosexuality from family and friends (11–13). They engage in bisexual behavior which may play a bridging role in the spread of HIV from a major at-risk group to the general population (14). However, none of the women in our cohort reported a husband who was gay which could be because either they were unaware of it or did not want to share this information (15). This poses difficulty for prevention and interventional measures and call for strengthening the need for HIV testing in this group (16).

With an aging society, China has the largest number of the elderly population in the world. Chinese elderly people are generally not considered as a high-risk for HIV infection (17). In our study, there were 5.78% (19/329) patients were more than 65 years old, which was consistent with other studies. In recent years, the HIV epidemic in China has expanded from high-risk groups to the general population including the elderly (18). Sexually transmitted infection was culprit in about 52.63% (10/19) cases in elderly. Unsafe commercial sex is an important factor of HIV infection in this age group (19). The elders are more vulnerable and more susceptible to interference of external factors. HIV epidemic among older is not only a medical

issue but also a social problem. Therefore, interventions should be oriented this population to take effective measures for both HIV prevention and treatment programs in order to improve the quality of their lives.

The passive screening is the main way to find HIV infection in the hospital. However, most of these patients already have advanced opportunistic infections or cancers. Late diagnosis means declining treatment effect and increased mortality (20). With the increasing awareness of HIV/AIDS, increasing number of agree of for counseling and testing during hospitalization. Individual counseling and testing accounted for 21.28% (70/329) of the total newly diagnosed HIV cases. Onward transmission of HIV from infected individuals is more likely if the infected individual is unaware of their own infection. Early diagnosis also provides an opportunity for maximizing the impact of avoiding spread to the recent partners.

Our study has some limitations. First, there were some HIV screen positive patients who refused for confirmatory testing, which could lead to statistical information bias. Second, due to anxiety and concern about the disclosure of HIV situation, patients could hide or falsify the sensitive questions in the questionnaires which could lead to information bias.

Despite these potential limitations, the study findings have important implications for HIV prevention, intervention and treatment for the people without fixed behavior characteristics in Nanjing, China. Most of them went to see a doctor unaware of their HIV status so HIV/AIDS distribution is relatively objective in the general population. China's HIV/AIDS prevention strategies and treatment measures have achieved significant results, but the number of people living with HIV continues to rise. HIV infection leads to an extremely stressful experience for many individuals, which may affect almost every aspect of their life. Studies have shown that increased stress among patients with HIV is related to other psychological illnesses such as depression and anxiety (21). Increased awareness of HIV/AIDS and familiarization with “Four Free and One Care” policy (free antiretroviral drugs, free prevention of mother-to-child transmission, free voluntary counseling and testing, free schooling for children orphaned by AIDS, and care to people living with HIV/AIDS) (3), decreases social anxiety and pressure and thus, the prevention and control of AIDS can be achieved effectively.

## Conclusions

Our results showed the MSM, females and adults over

65 years old have different sexual and psychosocial characteristics and these characteristics should be taken into account for HIV prevention, intervention and treatment when preventative strategies of HIV/AIDS shift from high-risk groups to the general population in China.

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### Footnote

*Conflicts of Interest:* All authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/jlpm.2019.04.01>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This observational study received ethical approval from the Ethics Committee at the First Affiliated Hospital of Nanjing Medical University (No. 2017-SR-212), and all clinical investigation have been conducted according to the principles expressed in the Declaration of Helsinki (as revised in 2013). Individual informed consent was waived.

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