

Preplanned Studies

Knowledge, Attitude, and Practice Towards Mpox and Associated Factors Among HIV-Infected Individuals — Beijing Municipality, China, 2023

Yue Gu¹; Ruiqi Ren¹; Jing Han²; Wenqing Bai¹; Yuanyuan Zhang^{2,3}; Haoliang Liu⁴; Zhaohe Li¹; Chao Li¹; Rui Song^{2,#}; Lei Zhou^{1,#}

Summary

What is already known about this topic?

Approximately 50% of patients with mpox are human immunodeficiency virus (HIV)-infected globally. Studies have shown that individuals with advanced HIV infection tend to have more severe clinical manifestations and higher mortality rates after mpox infection.

What is added by this report?

The study revealed that individuals living with HIV have a low level of Knowledge, Attitude, and Practice (KAP) towards mpox. Several factors, including age, registered residence, sexual orientation, education level, viral load, and co-occurrence of other sexually transmitted diseases, were found to influence the KAP towards mpox.

What are the implications for public health practice?

This study is the first to investigate the KAP of mpox among individuals living with HIV. The findings suggest that mpox health education should prioritize individuals with co-existing sexually transmitted diseases (STDs) and a high viral load.

The global mpox outbreak, starting in May 2022, has spread rapidly across non-endemic regions (1). In this wave of the epidemic, 38% to 50% of mpox patients are also human immunodeficiency virus (HIV)-infected individuals, which face a higher risk of mpox infection, more severe clinical symptoms, and higher mortality rates due to their compromised immune system (2). The spread of mpox is particularly insidious (3), and the absence of smallpox vaccination among individuals born after 1980 has resulted in their lack of resistance to mpox (4). Furthermore, there is currently a lack of effective treatment measures for mpox, with symptomatic supportive therapy being the primary approach in clinical practice. Consequently, preventing and controlling mpox heavily relies on

individuals' self-regulation and responsible behavior. The Knowledge, Attitude, and Practice (KAP) theory, frequently used in health education for HIV-infected individuals and men who have sex with men (MSMs), addresses this need. Establishing beliefs in individuals requires both knowledge and a strong sense of responsibility. Behavior changes positively only when knowledge transforms into belief. Given these circumstances, the objective of this study is to evaluate the current level of mpox KAP among HIV-infected individuals and identify potential influencing factors.

This cross-sectional study was conducted at the Beijing Ditan Hospital of Capital Medical University from July 18 to August 9, 2023, using convenience sampling through a combination of online and field surveys. The study included participants who were 18 years or older, without any gender restrictions, while those who had previously experienced mpox infection or participated in mpox-related programs were excluded. The field survey involved on-site data verification, while the online survey utilized the Questionnaire Star platform to implement logical jumps and limit responses to one per WeChat account, thus ensuring the questionnaire's data quality.

The questionnaire surveyed sociodemographic characteristics, HIV infection status, and mpox KAP. The 25-question knowledge section, based on the study by Jairoun AA et al. (5), scored 1 point per correct answer, with ≥ 16 points ($\geq 60\%$ accuracy) indicating mpox awareness. The attitude section included 16 questions and utilized a 5-point Likert scale. Higher scores indicated a more favorable attitude, with 5 points for strongly agree and 1 point for strongly disagree (and vice versa for negative statements). The total attitude score ranged from 16 to 80. Participants scoring ≥ 48 points (representing more than 60% of the total score) were considered to have a positive attitude towards mpox. To obtain the standardized attitude score, the dimension score was divided by the number of dimension entries. The

practice section consisted of 7 questions. The highest score for each question was 3 points, while the lowest score was 1 point. The total practice score ranged from 7 to 21. Participants scoring ≥ 17 points (representing more than 80% of the total score) were considered to have a positive practice towards mpox. A collinearity test was conducted on the independent variables (Supplementary Table S1, available at <https://weekly.chinacdc.cn/>). The mpox knowledge, attitude, practice, and KAP scores were converted into binary variables for binary logistic regression analysis.

Subject duplication was prevented by cross-verifying paper and electronic questionnaires using a unique identification code referred to as the ART (antiretroviral therapy) number. Statistical analysis was performed using SPSS software (web version 26.0; IBM, New York, USA) and RStudio software (version 4.2.1; R Foundation for Statistical Computing, Vienna, Austria). A significance level of $P < 0.05$ (two-tailed) was employed to determine statistical significance. The Ethics Committee of Ditan Hospital granted approval.

A total of 1,235 individuals with HIV infection were included, with 486 from field surveys and 749 from online surveys. Among the participants, 48.3% (597/1,235) were aged between 35 and 55, 91.5% (1,130/1,235) were male, 61.5% (760/1,235) identified as homosexual, and 61.7% (762/1,235) reported a monthly income over 5,000 Chinese Yuan (CNY). The majority of participants had not received influenza vaccination (72.5%, 895/1,235), had not experienced other sexually transmitted diseases (85.9%, 1,061/1,235), and did not have any chronic diseases (68.9%, 851/1,235). In addition, most respondents reported being infected with HIV for more than 3 years (75.7%, 935/1,235), had a latest CD4 cell count greater than $500/\text{mm}^3$ (55.3%, 683/1,235), and had a latest viral load test result of less than 20 copies/mL (76.2%, 941/1,235) (Table 1).

The mean knowledge score for mpox was 14 (interquartile range: 8–18, range: 0–25), with an awareness rate of 46.0%. Out of the 25 questions, two had a correct answer rate of over 80% (Q1 and Q8), while the other three questions had a correct answer rate over 70% but not exceeding 80% (Q7, Q18, and Q19). The lowest correct answer rate was observed for the two questions related to “rash” (Q12 and Q20). The dimension of epidemiologic characteristics had a relatively high correct answer rate (mean: 62.8%), while the treatment dimension had a low correct answer rate (mean: 37.4%). Three questions in the

treatment dimension had a correct answer rate of less than 30.0% (Q22, Q23, and Q24) (Supplementary Table S3, available at <https://weekly.chinacdc.cn/>). The results of the binary logistic regression analysis indicated that residing in an urban area, homosexual orientation, having a master’s degree or above, and having undetectable viral copies (< 20 cps/mL) were all positively associated with knowledge of mpox (Figure 1).

After accounting for standardization, the total score for mpox attitude was 3.81 (interquartile range: 3.50, 4.12). The barrier dimension had the lowest score, 3.25 (interquartile range: 2.50, 4.00) points (Supplementary Table S4, available at <https://weekly.chinacdc.cn/>). The results of the binary logistic regression analysis showed that having a master’s degree or higher education and not having any other sexually transmitted diseases (STDs) were positively associated with a favorable attitude towards mpox (Figure 1).

The score for mpox practice was 20 (interquartile range: 19, 21). Among the 1,235 individuals infected with HIV, a majority of them (87.3%, 1,078/1,235) sought medical advice upon experiencing unexplained lymphadenopathy and voluntarily disclosed recent exposure to mpox. Furthermore, 78.9% (975/1,235) of individuals expressed willingness to receive the mpox vaccine. With the exception of 27 individuals who had not initiated ART, the majority (87.0% 1,075/1,235) demonstrated good adherence to their daily ART medication. In the past six months, almost 30% (325/1,235) reported having two or more sexual partners, with 107 individuals engaging in male-to-male group sex. When experiencing mpox-related symptoms, the most common actions taken were seeking medical treatment at an infectious disease hospital (96.8%, 1,195/1,235), practicing home quarantine (30.8%, 380/1,235), and notifying the local CDC in their community of residence (29.4%, 363/1,235) (Table 2). The results of the binary logistic regression analysis indicated that not suffering from other STDs was a positive factor associated with the practice of mpox (Figure 1).

The total KAP score is calculated by summing the scores of mpox KAP. The score range is from 23 to 126, with the highest score being 124 points and the lowest score being 30 points. The majority of research subjects fall within the range of 90 to 106 points. Binary logistic regression analysis revealed that individuals below the age of 35, with homosexual orientation, holding a master’s degree or higher, and

TABLE 1. Sociodemographic characteristics and infection status of HIV-infected individuals (N=1,235).

Variable	n	Constituent ratio (%)	Awareness rate (%)	Knowledge score*	Mann-Whitney U test/Kruskal-Wallis test		Attitude score*	Mann-Whitney U test/Kruskal-Wallis test		Practice score*	Mann-Whitney U test/Kruskal-Wallis test		KAP score*	Mann-Whitney U test/Kruskal-Wallis test	
					U value/H value	P value		U value/H value	P value		U value/H value	P value		U value/H value	P value
Age, years															
<35	551	44.6	52.3	15 (10, 19)	62 (57, 68)		20 (19, 21)			97 (88, 105)					
35-55	597	48.3	43.0	14 (8, 18)	60 (55, 65)	43.8	<0.001	31.4	<0.001	20 (19, 21)	1.8	0.398	93 (83, 101)	43.6	<0.001
>55	87	7.1	26.4	9 (0, 15)	59 (52, 64)		20 (19, 21)			85 (77, 98)					
Gender															
Male	1,130	91.5	48.6	14 (9, 18)	61 (56, 67)		20 (19, 21)			95 (85, 103)					
Female	103	8.3	16.5	7 (0, 13)	59 (53, 64)	64.0	<0.001	10.9	0.004	21 (19, 21)	9.1	0.011	86 (76, 96)	37.1	<0.001
Transgender	2	0.2	100.0	22 (22, 22)	65 (57, 72)		21 (21, 21)			108 (100, 115)					
Registered residence															
Urban area	645	52.2	55.0	15 (11, 19)	62 (57, 67)	142,773.5†	<0.001	165,406.5†	<0.001	20 (19, 21)	142,449.0†	0.191	97 (88, 104)	149,673.5†	<0.001
Rural area	590	47.8	36.1	12 (6, 17)	60 (54, 65)					20 (19, 21)			92 (80, 100)		
Sexual orientation															
Homosexual	760	61.5	54.7	15 (10, 19)	62 (57, 67)		20 (19, 21)			97 (88, 104)					
Heterosexual	188	15.2	23.4	9 (2, 14)	58 (53, 64)	109.6	<0.001	40.6	<0.001	21 (19, 21)	11.2	0.011	87 (76, 97)	78.1	<0.001
Bisexual	208	16.9	41.8	13 (9, 17)	60 (55, 66)		20 (19, 21)			93 (85, 102)					
Uncertain	79	6.4	26.6	11 (1, 15)	57 (52, 64)		20 (18, 21)			83 (74, 99)					
Marital status															
Unmarried	774	62.7	54.5	15 (10, 19)	62 (57, 68)		20 (19, 21)			97 (89, 104)					
Married	291	23.6	28.9	11 (3, 15)	59 (53, 64)	97.6	<0.001	46.4	<0.001	20 (19, 21)	6.0	0.114	89 (79, 98)	83.4	<0.001
Divorced /widowed	144	11.6	34.0	13 (5, 17)	59 (54, 64)		20 (19, 21)			91 (81, 99)					
Cohabitation	26	2.1	50.0	15 (6, 18)	60 (57, 65)		20 (19, 21)			93 (80, 99)					
Education															
Master's degree or above	96	7.8	78.1	18 (15, 20)	63 (58, 69)		20 (19, 21)			100 (95, 107)					
University or technical college	678	54.9	55.0	15 (11, 19)	63 (57, 68)	209.9	<0.001	82.6	<0.001	20 (19, 21)	3.7	0.299	97 (90, 104)	179.2	<0.001
High school or technical secondary	293	23.7	30.4	11 (6, 15)	60 (54, 64)		20 (19, 21)			90 (80, 98)					

Variable	n	Constituent ratio (%)	Awareness rate (%)	Knowledge score*	Mann-Whitney U test/Kruskal-Wallis test		Attitude score*	Mann-Whitney U test/Kruskal-Wallis test		Practice score*	Mann-Whitney U test/Kruskal-Wallis test		KAP score*	Mann-Whitney U test/Kruskal-Wallis test	
					U value/H value	P value		U value/H value	P value		U value/H value	P value		U value/H value	P value
Junior high school or below	168	13.6	18.5	6 (0, 13)	56 (52, 62)	20 (18, 21)	82 (73, 94)								
Occupation															
Students	22	1.8	63.6	16 (12, 19)	65 (60, 69)	20 (20, 21)	101 (93, 108)								
Official staffs/Personnel of enterprises and institutions	144	11.7	55.6	16 (9, 19)	62 (58, 67)	20 (19, 21)	98 (88, 103)								
Commercial service providers	321	26.0	43.9	14 (9, 17)	60 (56, 66)	20 (18, 21)	94 (84, 101)	52.86	<0.001	39.4	<0.001	4.1	0.664	58.5	<0.001
Workers/Farmers	207	16.8	28.5	11 (3, 15)	58 (52, 64)	20 (19, 21)	88 (79, 97)								
Retired people	109	8.8	45.9	13 (9, 18)	61 (56, 66)	20 (19, 21)	93 (85, 103)								
Housekeeping and unemployment	14	1.1	57.1	18 (12, 21)	62 (57, 64)	21 (19, 21)	98 (91, 105)								
Others	418	33.8	51.7	15 (9, 19)	62 (56, 68)	20 (19, 21)	96 (87, 104)								
Monthly income															
<2,000 CNY	199	16.1	34.2	10 (3, 16)	59 (53, 65)	20 (19, 21)	88 (78, 101)								
2,000-4,999 CNY	274	22.2	34.3	12 (6, 17)	59 (54, 64)	20 (19, 21)	91 (80, 98)	69.6	<0.001	35.2	<0.001	4.0	0.259	70.3	<0.001
5,000-9,999 CNY	449	36.4	45.4	14 (9, 18)	62 (56, 68)	20 (19, 21)	95 (87, 103)								
>10,000 CNY	313	25.3	64.5	17 (13, 19)	62 (57, 67)	20 (19, 21)	98 (91, 105)								
Have you been vaccinated against flu?															
Yes	340	27.5	47.1	14 (8, 18)	60 (54, 65)	20 (19, 21)	94 (84, 102)	154,652.0 [†]	0.654	137,693.0 [†]	0.010	147,120.0 [†]	0.348	143,029 [†]	0.103
No	895	72.5	45.6	14 (9, 18)	61 (56, 67)	20 (19, 21)	95 (85, 103)								
Have any other sexually transmitted diseases?															
Yes	174	14.1	37.9	13 (7, 17)	60 (53, 65)	20 (18, 21)	92 (81, 100)	85,787.5 [†]	0.134	82,192.0 [†]	0.020	76,434.5 [†]	<0.001	860,817.5 [†]	0.008
No	1061	85.9	47.3	14 (9, 18)	61 (56, 67)	20 (19, 21)	95 (85, 103)								

Variable	n	Constituent ratio (%)	Awareness rate (%)	Knowledge score*	Mann-Whitney U test/Kruskal-Wallis test		Attitude score*	Mann-Whitney U test/Kruskal-Wallis test		Practice score*	Mann-Whitney U test/Kruskal-Wallis test		KAP score*	Mann-Whitney U test/Kruskal-Wallis test	
					U value/H value	P value		U value/H value	P value		U value/H value	P value		U value/H value	P value
Have any other chronic diseases?															
Yes	215	17.4	46.0	14 (10, 18)	61 (55, 66)	20 (19, 21)	20 (19, 21)	94 (85, 102)							
No	851	68.9	48.4	14 (9, 19)	61 (56, 67)	16.0	<0.001	20 (19, 21)	9.2	0.010	27.9	<0.001			
Uncertain	169	13.7	33.7	10 (5, 16)	58 (53, 64)	20 (18, 21)		88 (78, 99)							
Time of confirmed HIV infection															
<1 year	90	7.3	38.9	13 (5, 17)	61 (56, 66)	20 (19, 21)		94 (83, 101)							
1–3 years	210	17.0	48.1	14 (9, 18)	62 (56, 67)	2.9	0.231	20 (19, 21)	4.6	0.101	4.2	0.120			
>3 years	935	75.7	46.2	14 (8, 18)	61 (55, 66)	20 (19, 21)		94 (84, 102)							
Latest CD4 test results															
<350/mm ³	181	14.6	45.3	14 (9, 17)	60 (55, 65)	20 (19, 21)		95 (84, 102)							
350–500/mm ³	280	22.7	39.6	13 (7, 17)	62 (57, 67)	20 (19, 21)		94 (83, 102)							
>500/mm ³	683	55.3	52.1	15 (10, 19)	61 (56, 67)	25.1	<0.001	20 (19, 21)	5.9	0.052	46.2	<0.001			
Uncertain	91	7.4	20.9	8 (1, 13)	57 (52, 63)	20 (18, 21)		83 (74, 97)							
Latest varial copies test results															
<20 cps/mL (undetectable)	941	76.2	52.7	15 (10, 19)	62 (57, 67)	20 (19, 21)		96 (88, 104)							
<10 ⁵ cps/mL	107	8.6	31.8	11 (4, 15)	58 (53, 64)	58.0	<0.001	20 (19, 21)	2.2	0.329	119.5	<0.001			
>10 ⁵ cps/mL	17	1.4	29.4	10 (4, 15)	59 (52, 64)	21 (17, 21)		90 (78, 97)							
Uncertain	170	13.8	19.4	8 (0, 13)	57 (52, 63)	20 (18, 21)		83 (73, 95)							

Abbreviation: HIV=human immunodeficiency virus; CNY=Chinese Yuan; KPA=Knowledge, Attitude, and Practice.

* The normality test results for mpox knowledge, attitude, practice, and KAP scores and scores in all dimensions indicated that the data did not follow a normal distribution ($P<0.05$) (Supplementary Table S2, available at <https://weekly.chinacdc.cn/>). Consequently, the median and interquartile intervals were utilized to describe the scores.

† Calculations were conducted using the Mann-Whitney U test.

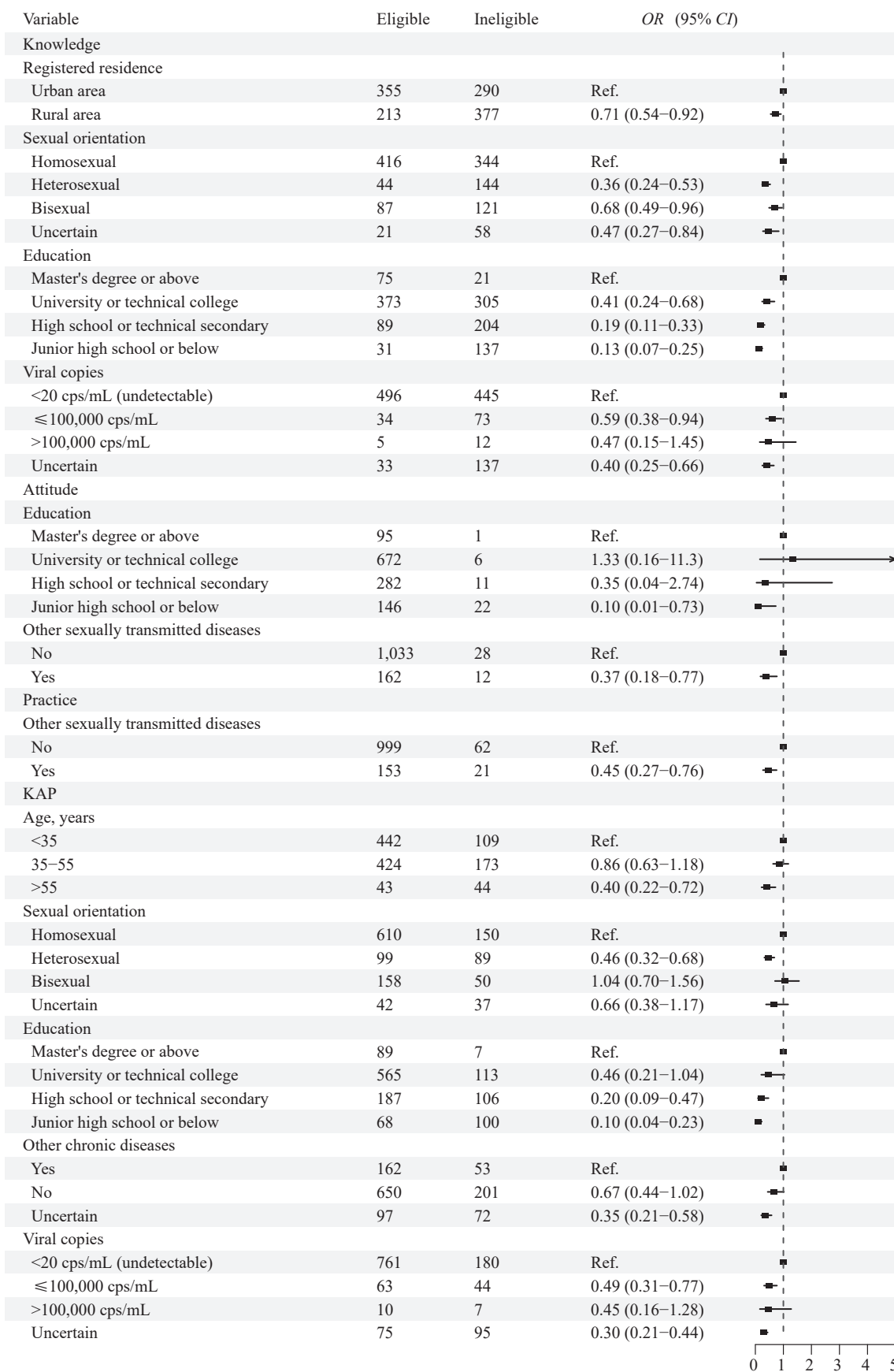


FIGURE 1. Binary logistic regression analysis of Knowledge, Attitude, and Practice of mpox. Abbreviation: OR=odds ratio; CI=confidence interval; KAP=Knowledge, Attitude, and Practice.

TABLE 2. Behavioral characteristics of mpox in HIV-infected individuals.

Variable	n	Constituent ratio/percent (%)
When you have unexplained lymphadenopathy, will you seek medical advice and inform yourself of mpox-related exposure voluntarily?		
Yes, I will seek medical advice and inform myself of mpox-related exposure voluntarily.	1,078	87.3
No, I will not seek medical advice and inform myself of mpox-related exposure voluntarily.	96	7.8
Yes, I will seek medical advice, but not inform myself of mpox-related exposure voluntarily.	30	2.4
Not seek medical advice	31	2.5
If the mpox vaccine is available, would you like to get it?		
Yes	975	78.9
Normal	202	16.4
No	58	4.7
What would you do if you had mpox-related symptoms? (Multiple choices)		
Go to an infectious disease hospital	1,195	96.8
Informing the CDC in the community of residence	363	29.4
Seek help from social organizations	238	19.3
Ask friends for help	76	6.2
Buy medicine by yourself	57	4.6
Home quarantine	380	30.8
Nothing was done	4	0.3
Whether you can take ART drugs regularly every day?		
Yes	1,075	87.0
Forget to take it occasionally every month (1 or 2 times)	126	10.2
No, I often forget.	7	0.6
ART is not initiated.	27	2.2
Number of sexual partners engaged in anal sex between men in the past six months.		
One	325	26.3
Two	173	14.0
Three and above	179	14.5
No same-sex sexual activity has occurred	558	45.2
Has there been any male-to-male group sexual activity in the past six months?		
Yes	107	8.7
No	1,128	91.3

Abbreviation: HIV=human immunodeficiency virus; ART=antiretroviral therapy.

having undetectable viral copies (<20 cps/mL) were all positive factors associated with higher mpox KAP scores. The relationship between suffering from chronic diseases and mpox KAP remains uncertain (Figure 1).

DISCUSSION

The survey revealed that the level of knowledge regarding mpox among 1,235 investigated HIV-infected individuals was low (46.0%). This aligns with

the awareness rate (47.2%, 1,781/3,563) of mpox among MSM reported by Zheng Min et al. in July 2022 (6) and is significantly lower than the knowledge of other infectious diseases such as acquired immunodeficiency syndrome (AIDS, 91.0%) (7) and syphilis (70.9%) (8). A low level of awareness regarding typical features of mpox, like rash, among HIV-infected individuals was found. It suggests that individuals with HIV do not associate rash with prevention measures or seek medical advice, which hinders self-monitoring of symptoms in key

populations. The attitude score towards mpox among HIV-infected individuals was moderate, similar to the findings of an analysis of AIDS health beliefs in newly infected individuals conducted by Yang Rongrong et al. (7.27/10) (9). A lower score in the dimension of the barrier indicates that HIV-infected individuals perceive more obstacles in preventing mpox. The practice scores for mpox were high, as most HIV-infected individuals proactively sought medical advice when experiencing mpox-related symptoms. However, more than 20% of respondents displayed hesitancy towards receiving the mpox vaccine, which was lower than in other studies (78.9% vs. 90.2%) (10).

Approximately 10% of participants engaged in male-to-male group sex in the past six months, increasing mpox infection risks. Despite higher mpox awareness in the homosexual population, behavior changes remain limited, indicating that high awareness rates do not necessarily translate into positive attitudes or behavioral changes. Studies have shown significant knowledge-behavior separation in MSM groups (11). Factors such as social discrimination and traditional culture contribute to the challenge of changing behaviors, with having multiple sexual partners being a common and difficult-to-change behavior in the community.

The absence of other STDs in the past six months positively influenced attitudes and practices related to mpox prevention measures among HIV-infected individuals. HIV-infected individuals with STDs were more likely to engage in sexual activity with multiple partners compared to those without STDs (39.5% vs. 26.6%). This indicates that individuals who are HIV-infected but do not have other STDs are more knowledgeable about safe sexual behavior and are more concerned about their own health in relation to diseases, prompting them to actively seek information about mpox prevention measures. Therefore, implementing interventions targeting HIV-infected individuals with STDs is essential for enhancing their KAP towards mpox.

Viral load significantly influences mpox KAP among individuals living with HIV. Those with undetectable viral load exhibited better medication adherence (89.4% vs. 79.2%). Improving ART effectiveness can enhance mpox KAP, subsequently reducing mpox infection risk. Therefore, targeted interventions and improved adherence to medication should be implemented for HIV-infected individuals with high viral load in order to enhance mpox prevention and control efforts.

This study has certain limitations. First, a convenience sampling method was used, which may affect the representativeness of the results. However, the large size of the cohort helps to mitigate this potential selection bias. Future research should aim to include studies from different regions to obtain a more comprehensive understanding. Second, the inclusion of sensitive questions, such as the number of sexual partners, might introduce information bias. To minimize this issue, questions were placed at the end of the questionnaire, and participants were provided with a private and quiet environment during the survey to encourage honest responses.

This study is the first to investigate mpox KAP among individuals living with HIV. The findings serve as a reference for preventing and managing mpox in this population. The survey results indicate that the level of mpox KAP among HIV-infected individuals is suboptimal. Age, registered residence, sexual orientation, education level, viral load, and co-infection with other STDs are factors that influence mpox KAP. Therefore, targeted mpox health education programs should be prioritized for HIV-infected individuals who have STDs and high viral load.

Conflicts of interest: No conflicts of interest.

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Corresponding authors: Lei Zhou, zhoulei@chinacdc.cn; Rui Song, 13126595640@163.com.

¹ Chinese Center for Disease Control and Prevention, Beijing, China;

² National Center for Infectious Diseases, Beijing Ditan Hospital, Capital Medical University, Beijing, China; ³ Beijing Key Laboratory of Emerging Infectious Diseases, Institute of Infectious Diseases, Beijing Ditan Hospital, Capital Medical University, Beijing, China; ⁴ Nanjing Medical University, Nanjing City, Jiangsu Province, China.

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SUPPLEMENTARY MATERIAL

SUPPLEMENTARY TABLE S1. Collinearity test of independent variables.

Variables	Non standardized coefficients		Standardized coefficients	t	P	Tolerance	VIF
	β	SE	β				
Age	-0.020	0.026	-0.024	-0.757	0.449	0.679	1.472
Gender	-0.129	0.048	-0.074	-2.684	0.007	0.888	1.126
Registered residence	-0.073	0.029	-0.073	-2.540	0.011	0.821	1.218
Sexual orientation	-0.037	0.014	-0.072	-2.561	0.011	0.868	1.152
Marital status	-0.028	0.019	-0.045	-1.496	0.135	0.769	1.300
Education	-0.125	0.020	-0.206	-6.377	<0.001	0.655	1.526
Occupation	<0.001	0.007	<0.001	-0.015	0.988	0.967	1.034
Monthly income	0.019	0.015	0.038	1.248	0.212	0.735	1.360
Have you been vaccinated against flu?	0.001	0.030	0.001	0.021	0.983	0.974	1.026
Have any other sexually transmitted diseases?	-0.063	0.038	-0.044	-1.671	0.095	0.972	1.029
Have any other chronic diseases?	-0.048	0.024	-0.053	-1.973	0.049	0.937	1.067
Time of confirmed HIV infection	-0.019	0.023	-0.023	-0.818	0.414	0.858	1.165
Latest CD4 test results	0.011	0.016	0.018	0.688	0.492	0.963	1.038
Latest varial copies test results	-0.071	0.014	-0.149	-5.069	<0.001	0.793	1.261

Abbreviation: SE=standard error; VIF=variance inflation factor.

SUPPLEMENTARY TABLE S2. Normality test of total score and scores in various dimensions of mpox.

Variables and dimensions	Shapiro-Wilk test	
	Z value	P value
Mpox knowledge score	0.937	<0.001
Basic cognition	0.874	<0.001
Epidemiological characteristics	0.876	<0.001
Clinical manifestation	0.890	<0.001
Prevention	0.866	<0.001
Treatment	0.912	<0.001
Mpox attitude score	0.986	<0.001
Susceptibility	0.949	<0.001
Seriousness	0.897	<0.001
Benefits	0.908	<0.001
Barrier	0.967	<0.001
Self-efficacy	0.807	<0.001
Mpox practice score	0.803	<0.001
Mpox KAP score	0.980	<0.001

Abbreviation: KAP=Knowledge, Attitude, and Practice.

SUPPLEMENTARY TABLE S3. List of mpox knowledge among subjects.

Knowledge dimension	Serial number	Items	Correct No.	Rate of correct answer (%)
Basic cognition	Q1	Mpox is a viral infectious disease.	994	80.5
	Q2	Mpox is a bacterial infectious disease.	519	42.0
	Q3	The current worldwide epidemic of mpox occurs mainly in tropical rainforest areas and occasionally in other areas.	488	39.5
Epidemiological characteristics	Q4	Do you know what are the sources of infection for mpox?	862	69.8
	Q5	Do you know the time interval between mpox infection and the onset of symptoms?	625	50.6
	Q6	Mpox can be transmitted from animals to humans through direct contact with the blood, body fluids, and consumption of undercooked meat of infected animals.	724	58.6
	Q7	Mpox can be transmitted from person to person through contact with respiratory secretions, blood, and body fluids of infected person.	953	77.2
	Q8	Mpox can be transmitted sexually.	1,007	81.5
	Q9	People are generally susceptible to mpox.	480	38.9
Clinical manifestation	Q10	Mpox and smallpox have similar signs and symptoms.	661	53.5
	Q11	Will people experience fever, runny nose, sore throat, and other cold symptoms in the early stages after being infected with mpox?	805	65.2
	Q12	How long does mpox rash usually appear after onset?	134	10.9
	Q13	After infection with mpox, will there be lymphadenopathy?	659	53.4
	Q14	After infection with mpox, will muscle pain and severe headache occur?	647	52.4
	Q15	Mpox is a self-limited disease with symptoms usually lasting 2-4 weeks.	581	47.0
Prevention	Q16	Can 20 seconds of regular hand washing with soap or alcohol-based hand sanitizer prevent mpox transmission?	550	44.5
	Q17	Can mpox transmission be prevented by avoiding contact with wild animals (live or dead) or by adequately cooking wild animal products?	661	53.5
	Q18	Can mpox transmission be prevented by avoiding any object that has been in contact with a mpox patient/sick animal?	866	70.1
	Q19	Can reducing the number of sexual partners reduce the risk of mpox transmission?	930	75.3
	Q20	Can transmission of mpox be prevented by avoiding contact with anyone with rash?	196	15.9
Treatment	Q21	The treatment of mpox should be based on symptomatic and supportive treatment.	824	66.7
	Q22	Can Paracetamol be used to treat patients with mpox fever?	313	25.3
	Q23	Are antibiotics effective in the treatment of mpox?	212	17.2
	Q24	For AIDS patients co-infected with mpox, can effective ART improve the treatment effect of mpox?	308	24.9
	Q25	So far, there is no effective cure for mpox. Is that correct?	653	52.9

Abbreviation: AIDS=acquired immunodeficiency syndrome; ART=antiretroviral therapy.

SUPPLEMENTARY TABLE S4. Mpox attitude total and dimensional scores.

Variables	Range of scores	Score M (Q25, Q75)*	Standardized score M (Q25, Q75)*	Explanation
Mpox attitude score	16.00–80.00	61.00 (56.00, 66.00)	3.81 (3.50, 4.12)	
Susceptibility	3.00–15.00	12.00 (10.00, 13.00)	4.00 (3.33, 4.33)	Individual's subjective feelings about the possibility of suffering from mpox.
Seriousness	3.00–15.00	12.00 (10.00, 14.00)	4.00 (3.33, 4.67)	Individual's subjective perceptions and feelings about the severity of mpox.
Benefits	4.00–20.00	16.00 (14.00, 20.00)	4.00 (3.50, 5.00)	Individual's subjective perceptions and feelings about the benefits obtained by taking healthy behaviors.
Barrier	4.00–20.00	13.00 (10.00, 16.00)	3.25 (2.50, 4.00)	Individual's subjective perceptions and feelings of difficulties or obstacles that may be encountered in mpox prevention.
Self-efficacy	2.00–10.00	8.00 (8.00, 10.00)	4.00 (4.00, 5.00)	Individuals confidence in developing good sexual behaviors.

* The normality test results of mpox attitude scores and scores in all dimensions showed that the data did not follow normal distribution ($P<0.05$) (Supplementary Table S2). Therefore, median and interquartile intervals were used to describe attitude scores.