

Characterization and Sexual Partner Notification Analysis of Newly Confirmed HIV/AIDS in Kunming City from 2021 to 2022

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Abstract

Objective: The study aims to analyze the successful mobilization of sexual partners to participate in contact tracing and the factors affecting it for the newly confirmed HIV/AIDS in Kunming City from 2021 to 2022, in order to provide the basis for the further precise implementation of AIDS prevention and control measures.

Methods: We recruited newly confirmed HIV/AIDS in Kunming from January 1, 2021 to December 31, 2022 as the study population, and conducted the Field Epidemiological Investigation using of face-to-face surveys to collect socio-demographic information, history of exposure to high-risk behaviors, and history of HIV testing of positively infected persons and their sexual partners.

Results: 619 cases were included in the analysis of participating contact tracing seeds in Kunming City from 2021 to 2022, including 415 (67.0%) males, 192 (31.0%) unmarried, and 265 (42.8%) married with a spouse. The results of Regression of binary logistic showed that the gender of the seed infected person and the type of sexual partner were the influencing factors of the positive detection rate of sexual partners ($P < 0.05$), female seeds were more likely to trace positive contacts than males, with an OR value of 3.088 (95% CI: 2.075-4.596), and spouses were more likely to trace positive contacts than heterosexual regular sexual partners, with an OR value of 1.849 (95% CI: 1.236-2.765).

Conclusion: Women should be considered as an important target for traceability when conducting contact tracing to improve the efficiency of traceability. Behavior change communication and health behavior promotion efforts targeting spouses should be strengthened. Contact tracing should be integrated into the daily intervention and testing work, and the establishment of a good relationship should be the prerequisite for actively mobilizing the traceability of HIV testing.

Keywords: HIV/AIDS; Sexual Partner Contact Tracing; Influential Factors; Tracing Technology; Epidemiological Investigations

Abbreviations

HIV: Human immunodeficiency virus; AIDS: Acquired immunodeficiency syndrome; VCT: voluntary counseling testing; PITC: provider-initiated HIV testing and counseling

Background

The AIDS tracing technology is one of the foundations for discovering HIV/AIDS, clarifying transmission pathways, and interrupting the chain of transmission to prevent HIV spread [1]. Tracing technology, also known as contact tracing, is a method used to identify the source of infection and transmission based on case finding, which relies on epidemiological investigations or follow-ups of infected individuals [2]. The basic principle is that the seed (the initial HIV-infected person) voluntarily provides the first generation of high-risk behavioral contacts (first-generation tracing) for HIV testing, then, the first-generation positive cases provide information about second-generation high-risk contacts (second-generation tracing), and so on, forming a transmission chain until the trail is interrupted [3]. Voluntary counseling and testing (VCT) is an effective HIV prevention intervention, whilst the low uptake has hindered global attempts to prevent new HIV infections [3]. Provider-initiated HIV testing and counseling (PITC) is an important part of HIV prevention and treatment, but it suffers from inadequate training of health workers, little practice, and inability to provide appropriate counseling to patients due to lack of knowledge [4]. This study used contact tracing to analyse seeds and close contacts, breaking through the limitations of the original testing strategies [(VCT), (PITC), etc.]. Yunnan Province began exploring and piloting HIV contact tracing and counseling testing in 2008 [6-8]. Since 2015, Yunnan Province has continued to practice and improve the strategy of traceability and counseling testing of HIV contacts, and has promoted this strategy throughout the province since 2018 [8]. This study analyzes

the successful mobilization of sexual partners to participate in contact tracing testing and the factors affecting it for the newly confirmed HIV/AIDS in Kunming City in 2021-2022, which surveyed, analysed and reported on participants' attitudes to condom use, disclosure of HIV status, and sexual behaviour surveys and other topics, and provides a basis for further precise implementation of AIDS prevention and control measures.

Methods

Study Subjects

Inclusion criteria: individuals newly confirmed with HIV/AIDS in Kunming city from January 1, 2021 to December 31, 2022, with current residence in Kunming, and no loss to follow-up; informed consent was obtained from infected individuals. The inclusion time frame for contacts was after the seeds were confirmed positive. This study was approved by the Biomedical Research Ethics Committee of the Kunming Center for Disease Control and Prevention (No. 05).

Study Methods

The study employed the Field Epidemiological Investigation, with relevant personnel from the Disease Control Center, hospitals, and social organizations responsible for conducting face-to-face surveys. Epidemiological data were collected from HIV-positive individuals and their contacts, including socio-demographic information, a history of high-risk behavior exposures, and HIV testing history. The specific HIV contact tracing workflow is shown in Figure 1.

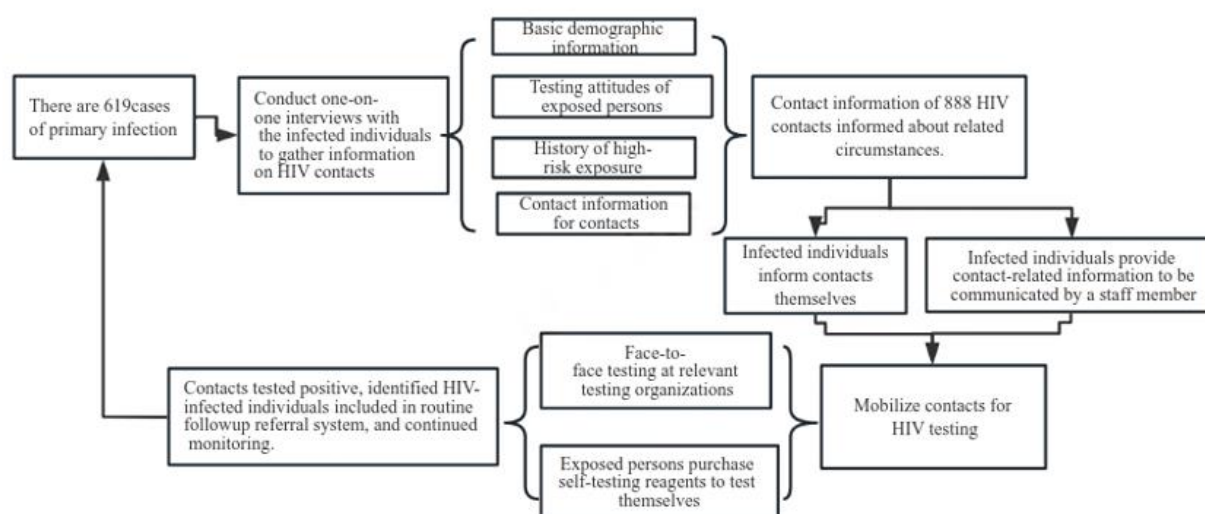


Figure 1: HIV contact tracing workflow

Statistical Analysis

A database was established using EpiData 3.1 software, followed by data entry and error checks. Statistical analysis and data cleaning were performed using SPSS 19.0 software. General demographic information, HIV testing history, and sexual behavioral history were used as variables in chi-square test and binary logistic regression analyses to determine whether a retrospectively identified contact tested positive for HIV. OR (95% CI) was used to estimate the strength of association between the independent variable factors and the dependent variable, with a significance level set at 0.05.

Results General Information

There were 635 newly confirmed cases of HIV/AIDS in Kunming City from 2021-2022 and the results of contact tracing were missing for 16 cases after completing the investigation, leaving 619 cases for analysis, resulting in a response rate of 97.5%. Among the 619 study subjects, the average age was 44.1 ± 14.4 years, 415 (67.0%) were male, 192 (31.0%) were unmarried, 265 (42.8%) were married with a spouse, 409 (66.7%) had junior high school education or below, 617 (99.7%) had their current address in Kunming, 365 (59.0%) living in towns, 280 (45.2%) living alone, and 292 (47.2%) living with a spouse/regular sexu-

al partner. There were 209 cases (33.8%) who were mainly farmers, 150 cases (24.2%) who were migrant workers, and 272 cases (43.9%) who had a monthly income level of RMB 2,000-3,500. 619 seed contacts tested positive in 142 cases (22.9%), and the type of sexual partners of the seeds was dominated by heterosexual regular sex partners in 410 cases (66.2%). The mode of transmission was dominated by heterosexual sexual transmission in 524 cases (84.7%). The investigation location at the CDC/Community Health Center had 390 cases (63.0%). See Table 2.

Attitude Toward Contact Tracing Testing for Newly Confirmed HIV/AIDS and history of exposure to high-risk behaviors

614 cases (99.2%) considered it was necessary to test individuals who had engaged in high-risk behavior with infected individuals for HIV infection risk, and 576 cases (93.1%) were willing to inform their sexual partners who had engaged in high-risk behavior of their infection status. 612 cases (98.9%) had engaged in sexual intercourse with others, of which 549 cases (90.0%) never used/sometimes used condoms, and the primary reasons for not using condoms, 161 cases (26.0%) did not think it was necessary to use them and 161 cases (26.0%) forgot to use them, and 184 cases (29.7%) had unprotected sex less than once a week. There were 236 cases (38.1%) who had sexual inter-

course with their spouse in the last year (heterosexual partners) and 48 cases (7.8%) who had male-to-male sex with a male regular partner in the last year. There were 129 cases

(20.8%) who had sex with a heterosexual regular sexual partner other than their spouse in the last year, and 213 cases (34.4%) who had sex with a heterosexual casual sexual partner. See Table 1.

Table 1: Characteristics of Newly Diagnosed HIV/AIDS High-Risk Behaviors in Kunming, 2021-2022 (n, %)

Variables	Total cases(N=619)	Positive contacts		P value
		N	Percentage(%)	
Whether to test if at risk of infection				0.875
Yes	614	141	23.0	
No	5	1	20.0	
Whether inform sexual partners of their high-risk behavior				0.281
Yes	576	135	23.4	
No	43	7	16.3	
Sexual intercourse with others				0.584
Yes	612	141	23.0	
No	7	1	14.3	
Whether condoms are used during sex				0.952
Never Use:	123	30	24.4	
Sometimes Use	426	98	23.0	
Always Use	54	13	24.1	
No sexual Activity	7	1	14.3	
Frequency of Unprotected Sexual Activity per Month				0.490
<1 time/week	184	48	26.1	
1 time/week	180	35	19.4	
2 times/week	140	36	25.7	
≥3 times/week	54	9	16.7	
Protective Sexual Activity	54	13	24.1	
No sexual Activity	7	1	14.3	
Heterosexual sex with spouse in the last year				0.490
Yes	236	49	20.8	
No	376	92	24.5	
No sexual Activity*	7	1	14.3	
male-to-male sex with a Male regular sexual partner in the last year				0.300
Yes	48	7	14.6	
No	564	134	23.8	

No sexual Activity*	7	1	14.3	
Sex with a Heterosexual regular sexual partner, other than the spouse, in the last year				0.822
Yes	129	31	24.0	
No	483	110	22.8	
No sexual Activity*	7	1	14.3	
Sex with a casual heterosexual partner in the last year				0.525
Yes	213	54	25.4	
No	399	87	21.8	
No sexual Activity*	7	1	14.3	

Note: *Some missing values are not included in the single-factor analysis.

Multivariate analysis of Newly Acquired HIV/AIDS Infections

A binary logistic regression analysis was conducted with whether the sexual partners traced from the tracing seeds were positive was used as the dependent variable (0=No, 1=Yes), and gender, education level, occupation, current address, marital status, living condition, contact tracing survey locations, and the type of sexual partner of the seed as the independent variables analyzed with ² analysis statisti-

cal significance ($P < 0.05$). The results indicate that the gender of the surveyed seeds and the type of seed contacts had a statistically significant ($P < 0.05$) effect on whether the traced contacts are positive, with female seeds more likely to trace positive contacts than males, with an OR of 3.088 (95% CI: 2.075-4.596), and with the type of seed partner being a spouse more likely to trace positive contacts than a heterosexual regular partner, with an OR of value of 1.849 (95% CI: 1.236-2.765). See Table 2.

Table 2: Analysis of socio-demographic characteristics and traceability influencing factors of newly confirmed HIV/AIDS in Kunming, 2021-2022 (n,%)

Variables	N (N=619)	Contact HIV test results		P value	Multifactor logistic regression analysis	
		Positive(N=142)	Negative(N=477)		OR (95%CI)	P value
Gender				<0.001		
Male	415	64(15.4)	351(84.6)		1	
Female	204	78(38.2)	126(61.8)		3.088(2.075,4.596)	<0.001
Age				0.174		
<25	65	11(16.9)	54(83.1)			
25~34	108	18(16.7)	90(83.3)			
35~44	129	29(22.5)	100(77.5)			
45~54	163	41(25.2)	122(74.8)			
≥55	154	43(27.9)	111(72.1)			
Education level				0.004		

Junior High School or Below	409	109(26.7)	300(73.3)			
High School or Technical School	89	18(20.2)	71(79.8)			
College or Above	121	15(12.4)	106(87.6)			
Occupation				0.011		
Farmer	209	59(28.2)	150(71.8)			
Migrant worker	150	22(14.7)	128(85.3)			
Unemployed	116	32(27.6)	84(72.4)			
Worker/Student/ Others	144	29(20.1)	115(79.9)			
Current Residence				0.004		
Main City Area	270	47(17.4)	223(82.6)			
Other Urban Areas	349	95(27.2)	254(72.8)			
Marital Status				<0.001		
Unmarried	192	22(11.5)	170(88.5)			
Married with Spouse	265	80(30.2)	185(69.8)			
Divorced or Separated	130	33(25.4)	97(74.6)			
Widowed/Living Together	32	7(21.9)	25(78.1)			
Living Condition				0.003		
Living Alone	280	45(16.1)	235(83.9)			
Living with Spouse/Regular sexual Partner	292	84(28.8)	208(71.2)			
Living with Children	32	9(28.1)	23(71.9)			
Others	15	4(26.7)	11(73.3)			
Monthly Income Level				0.132		
<1000	70	16(22.9)	54(77.1)			
1000-2000	108	18(16.7)	90(83.3)			
2000-3500	272	75(27.6)	197(72.4)			
3500-5000	129	24(18.6)	105(81.4)			
>5000	40	9(22.5)	31(77.5)			
Contact Tracing Investigation Location				0.016		
CDC/Community Health Center	390	95(24.4)	295(75.6)			
Hospital	91	28(30.8)	63(69.2)			
Social Organization	137	19(13.9)	118(86.1)			

Detoxification Center*	1	0(0.0)	1(100.0)			
Types of Sexual Partners for Seeds				<0.001		
Heterosexual Regular Partner	410	75(18.3)	335(81.7)		1	
Spouse	207	67(32.4)	140(67.6)		1.849(1.236,2.765)	0.003
Method of Sexual Activity				0.433		
Heterosexual Activity	524	125(23.9)	399(76.1)			
Same-Sex Activity	88	16(18.2)	72(81.8)			
nonsexual behavior*	7	0(0.0)	7(100.0)			

Note: *Some missing values are not included in the single-factor analysis.

Basic Characteristics of the traceability contacts

A total of 888 contacts were traced in this survey, all of whom were tested for HIV. A total of 301 contacts were traced from female infected patients, with 92 contacts (30.6%) aged 45-55 years old, 243 contacts (80.7%) with junior high school education or below, 111 contacts (36.9%) with farmers as their occupation, and 242 contacts (80.4%) living in the main urban area. The primary method of introduction between the seeds and contacts was through introductions by other individuals in 252 cases (83.7%). There were 301 contacts who received HIV testing, 97 tested posi-

tive (including previous positives), with a contact tracing positivity rate of 32%, as shown in Table 3.

The seed of contact type as spouse traced back to 244 cases of contacts, with 81 cases (33.2%) mainly older than 55 years old, 212 cases (86.9%) with junior high school education or lower, 112 cases (45.9%) mainly farmers by occupation, and 225 cases (92.2%) living in the main urban area. Seeds and contacts were mainly introduced by other people in 239 cases (98.0%). 244 persons were tested for HIV, 77 were positive, with a contact tracing positivity rate of 31.6%, as shown in Table 3.

Table 3: Sociodemographic Characteristics of Female and Spouse Contact Tracing in Kunming City from 2021 to 2022

Variables	Female Traceability Contacts		Spouse Traceability Contacts	
	N=301	Percentage(%)	N=244	Percentage(%)
Age				
<35	46	15.2	34	13.9
35~44	77	25.6	52	21.3
45~54	92	30.6	77	31.6
≥55	86	28.6	81	33.2
Ethnicity				
Han	270	89.7	218	89.3
Minority Ethnicity	31	10.3	26	10.7
Education Level				
Junior High School or Below	243	80.7	212	86.9
High School or Technical School	45	15	25	10.2

College or Above	13	4.3	7	2.9
Occupation				
Farmer	111	36.9	112	45.9
Migrant worker	84	27.9	38	15.5
Unemployed	46	15.3	47	19.3
Worker/Student/Other	60	19.9	47	19.3
Current Residence				
Main City Area	242	80.4	225	92.2
Other Urban Areas	59	19.6	19	7.8
Marital Status				
Unmarried	60	19.9	9	3.7
Married with Spouse	136	45.2	236	95.5
Divorced or Separated	16	5.3	1	0.4
Widowed/Living Together	89	29.6	1	0.4
Duration of Relationship				
≤1year	116	38.5	8	3.3
2-4 years	54	17.9	18	7.4
≥5 years	131	43.6	218	89.3
Method of Introduction				
Dance Hall/Bar/Public Places	13	4.3	1	0.4
Social Apps	36	12	4	1.6
Introduced by Acquaintance/Friend	252	83.7	239	98.0
Whether condoms are used during sex				
Never Use	77	25.6	78	32
Sometimes Use	171	56.5	131	53.7
Always Use	53	17.9	35	14.3
Frequency of Unprotected Sexual Activity per Month				
< 1 time/week	144	47.8	123	50.4
1 time/week	100	33.2	82	33.6
2 times/week	48	15.9	28	11.5
≥3 times/week	9	3.1	11	4.5
Relationship Status with the Seed				
Continue	211	70.1	240	98.4
Ended	90	29.9	4	1.6
Ways of Being Informed				

Informed by the Infected Person	177	58.8	141	57.8
Informed by the Follow-Up Person	56	18.6	41	16.8
Joint Notification	68	22.6	62	25.4
HIV Testing Result				
Positive	97	32.2	77	31.6
Negative	204	67.8	167	68.4

Discussion

The purpose of this study was to analyze the success of motivating sexual partners of seed-infected individuals to participate in contact tracing testing and to identify influencing factors, in order to provide a basis for further precise implementation of HIV prevention and control measures. The contact tracing results revealed that 614 cases (99.2%) believed it was necessary to test individuals who had engaged in high-risk behaviors with infected individuals, but, 549 of them (90.0%) had a low frequency of condom use, indicating that inconsistency in knowledge and behavior among infected people is very common, and that the popularization and education of the basics of HIV and the correct use of condoms should be strengthened to increase the awareness of the infected people and their behavioral to reduce the risk of transmission.

Women only accounted for 33.0% of the participants in the survey, but women were more likely to trace positive contacts than men, with an OR of 3.088 (95% CI: 2.075-4.596) and a positive traceability rate of 32.2%, and the traced contacts were mainly introduced by friends/acquaintances rather than spouses, and most of the high-risk behaviors occurred after being introduced by their peers, which should emphasize the importance of paying attention to introductions by friends/acquaintances as a primary method of contact tracing and calls for a focus on females as important subjects for contact tracing to improve efficiency [9-11].

Only 33.4% (207/619) of the seed contact types were spouses, but they were more likely to trace positive contacts than heterosexual regular partners, with an OR of 1.849 (95% CI: 1.236-2.765) and a trace positive rate of 31.6%. It suggests that the transmission trend between mar-

ried couples is obvious, in daily work, it is essential to provide HIV-related knowledge to single-positive families, regularly distribute relevant promotional materials, and provide strong support to reduce the single-positive family partners of the positive transfer rate, for those infected who do not want to inform their spouses of the fact of infection should be strengthened to motivation and treatment. Behavioral interventions for spouses should also be strengthened, including behavior change communication and health behavior promotion [12].

High-risk behavioral contact tracing is better than VCT and PITC in terms of infection detection efficiency, and studies have shown that the positive detection rate by driving testing of HIV/AIDS sexual partners (23.3%) is much higher than the positive detection rate of VCT and PITC (3.7%, 0.2%) during the same period [9, 14]. This study concluded that the "precision contact tracing" strategy is more suitable for newly reported HIV/AIDS infections [13], and that the focus of contact tracing should be on female infected individuals and their spouses, so that positive infections can be traced out more effectively. It is recommended to integrate contact tracing into routine intervention and testing work, establish a good relationship as a prerequisite, actively mobilize contact tracing HIV testing, and provide contact tracing counseling while offering services such as result notification, initial follow-up, and antiretroviral therapy referral to newly reported HIV-positive individuals. These approaches can help infected individuals understand the significance of motivating HIV contacts to undergo testing, accurately identify potentially HIV-positive contacts, and implement HIV contact tracing testing more precisely.

This study reveals the high efficiency of uncovering hidden positive cases through sexual partner tracing in-

vestigations, which is a finding of significant value to public health prevention strategies. However, there are two challenges to collecting information on patients' sexual contact history through questionnaires: firstly, respondents may have recall bias. Secondly, some respondents may be inclined to conceal information due to the highly sensitive nature of sexual privacy, potentially affecting the accuracy of the results. To further advance this research, future studies could leverage cutting-edge HIV molecular network technology to objectively construct and visualize patients' sexual networks. Special attention could be given to "super-spreaders" within the network, enabling more targeted and effective tracing investigations and interventions. This would enhance the precision and efficiency of HIV prevention efforts, laying a solid foundation for achieving the ambitious goal of ending the HIV epidemic. In order to promote the further development of the study, future research can make use of the cutting-edge technology of HIV molecular network to objectively construct and display the patient's sexual relationship network, pay special attention to the 'super-transmitters' in the network, and implement accurate and effective tracking investigation and intervention measures, which will enhance the precision and efficiency of HIV prevention efforts, laying a solid foundation for achieving the ambitious goal of ending the HIV epidemic.

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Authors' Contributions

LY conceived and designed and integrated the study, LL, ZLW extracted and analysed the data, interpreted

the results and drafted the manuscript. LMY reviewed the literature and translated essay, LL, ZXW, WJY, HWJ, LB were involved in the study selection, project research and questionnaire design, data collection and quality assessment. All authors have read and approved the manuscript.

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Availability of Data and Materials

The data used in this study are available from the corresponding author upon reasonable request.

Declarations

Ethics Approval and Consent to Participate

This study was reviewed and approved by the Ethics Committee of Kunming Centers for Disease Control and Prevention. The informed consent obtained from participants was verbal. After the participants agreed to participate in the investigation, we documented the consent one by one. We keep the participants' information strictly confidential. And the ethics committee approved this procedure because the participants only need cooperate for questionnaire survey without clinic survey.

Competing Interests

The authors declare that they have no competing interests.

References

1. YE Runhua, XIANG Lifan, YANG Yuecheng, et al. (2010) Traceability of newly reported HIV infections in Dehong Prefecture, Yunnan Province [J]. *Chinese Journal of Epidemiology*, 31: 39-42.
2. Dalle Nogare F, Di Lorenzo F, Sanfilippo A, Dalle Nogare ER, Arena N, Prestileo T (2014) Contact tracing e partner notification in una coorte di pazienti con infezione da HIV. Uno studio prospettico condotto a Palermo nel 2012 [Contact tracing and partner notification among a cohort of HIV-1 infected patients. A prospective study carried out in Palermo in 2012]. *Recenti Prog Med*. 105: 327-32.
3. WU Yongqin, ZOU Xiaobai, Chen Xi (2017) Research progress of HIV traceability technology [J]. *Practical Preventive Medicine*, 24: 762-5.
4. Bateganya MH, Abdulwadud OA, Kiene SM (2007) Home-based HIV voluntary counseling and testing in developing countries. *Cochrane Database Syst Rev*. 4: CD006493.
5. Marwa R, Anaeli A (2020) Perceived Barriers Toward Provider-Initiated HIV Testing and Counseling (PITC) in Pediatric Clinics: A Qualitative Study Involving Two Regional Hospitals in Dar-Es-Salaam, Tanzania. *HIV AIDS (Auckl)*. 12: 141-50.
6. YU Huifen, JIA Manhong, AN Xiaojing, et al. (2010) Tracking analysis of high-risk behavioral contacts of HIV/AIDS patients in Yunnan Province in 2008 [J]. *Chinese Journal of Epidemiology*, 31: 1445-6.
7. Ye Runhua, Xiang Lifan, Yang Yuecheng, et al. (2010) Traceability survey of newly reported HIV infections in Dehong Prefecture, Yunnan Province [J]. *Chinese Journal of Epidemiology*, 31: 39-42.
8. Shan Duo, Duan Song, Cui Yan, et al. (2009) Traceability survey of newly reported HIV infections in Dehong Prefecture, Yunnan Province, 2009 [J]. *Chinese Journal of Preventive Medicine*, 45: 965-70.
9. Han Yu, AN Xiaojing, MA Yanling, et al. (2022) Exploration of HIV contact tracing and counseling testing practice in Yunnan Province [J]. *China AIDS STD*, 28: 852-4.
10. Jiang HB, Zhang DD, Hong H, et al. (2021) Characteristics of new infections and analysis of their influencing factors among newly confirmed HIV/AIDS in Ningbo City, 2017-2020. *Chinese Journal of Epidemiology*, 42: 2112-7.
11. Liu Xuemei, Feng Xianxiang, Liang Jiajia. (2018) Traceability investigation and analysis of newly reported HIV infected persons/patients in Liuzhou City [J]. *Applied Preventive Medicine*, 24: 359-60.
12. Ni Zhikan, Luo Mingyu, Pan Xiaohong, et al. (2019) Analysis of successful mobilization of sexual partners for testing and associated factors among HIV-infected men who have sex with men in Zhejiang Province. *Chinese Journal of Epidemiology*, 40: 1606-11.
13. Yu HF, Han Y, Huo JL, et al. (2016) Impact of husband-wife relationship on the positive transfer of spouses in HIV single-positive families [J]. *China Public Health*, 32: 1455-8.
14. Huo Junli, AN Xiaojing, Han Yu et al. (2023) Exploration and practice of social organizations to carry out traceability of HIV contacts among men who have sex with men (MSM) in Yunnan Province in 2020 [J]. *Chinese Journal of Preventive Medicine*, 24: 502-4.

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