

HIV/AIDS knowledge, attitude and prevention assessment of residents in Liangshan prefecture: A cross-sectional survey

Gang Tian

Affiliated Hospital of Southwest Medical University

Zhangrui Zeng

Affiliated Hospital of Southwest Medical University

Jun Long

Affiliated Hospital of Southwest Medical University

Shaohua Wang

Affiliated Hospital of Southwest Medical University

Hu Fu

Affiliated Hospital of Southwest Medical University

Jinbo Liu

Affiliated Hospital of Southwest Medical University

Guangrong Li

Affiliated Hospital of Southwest Medical University

Qin Wang (✉ wangq@swmu.edu.cn)

Sichuan Provincial Center for Gynaecology and Breast Diseases <https://orcid.org/0000-0002-4116-3215>

Research article

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Abstract

Background The knowledge, attitude and prevention methods are crucial to avoid and prevent potential HIV infection especially in Liangshan prefecture, a high HIV infection prevalence area in China. Currently, as HIV/AIDS related studies were mainly based on sentinel surveillance groups and students, little information is known for local community residents. Our objectives were to survey HIV/AIDS related knowledge, attitude and prevention methods in these general populations to take targeted action for better prevention and control of HIV infection. **Methods** A large sample, multicounty based cross-sectional study was conducted to select seven counties randomly from 15 Yi ethnic counties plus the capital city, Xichang, for this study. A method of stratified cluster sampling was used to select 5500 local community residents in these eight counties from September 12, 2017 to October 23, 2018. **Results** Only 65.8% of respondents gave correct responses to all HIV/AIDS related knowledge and routes of transmission. The differences were significantly related to age distribution ($P < 0.001$), gender ($P = 0.006$), ethnicity ($P < 0.001$), educational level ($P < 0.001$), residence ($P < 0.001$) as well as fixed income or work ($P < 0.001$). Multicounty analysis showed the total correct answer rate of Xichang city was the highest (83.8%) in eight counties, whereas Meigu county (57.5%), Zhaojue county (50.9%) and Butuo country (48.2%) were the lowest. The positive answer rates of respondents to HIV/AIDS attitudes varied from 33.0% to 80.3%. 33.0% of the respondents wanted to have a child even though their spouse was infected with HIV, and 39.9% of the represents emerged in suicidal ideas if the HIV test results were positive. As for the prevention methods, 32.6% of the respondents did not use a condom during sexual intercourse, and 26.9% of the respondents did not approve to encourage free HIV screening. **Conclusion** It is urgent to strengthen the popularization of HIV/AIDS related knowledge and routes of transmission, and take targeted intervention and prevention policies for local community residents in Liangshan prefecture.

Background

HIV infection is an emerging global public health problem. Individuals with HIV infection and AIDS patients would die within several years after the diagnosis if effective drug intervention and prevention measures were lack. Since the first case of HIV was reported in the United States in 1981, the incidence of HIV infection and AIDS increased sharply both in developing and developed countries [1]. Literature show that the number of people living with HIV has exceeded 36.9 million in the world, and the annual death toll is more than one million [2]. There would still be nearly two million new infections each year, consequently resulting in a worldwide lifelong treatment target of 40 million individuals living with HIV [3]. The number of people with HIV infection is also increasing in China. The Chinese Center for Disease Control and Prevention revealed the number of people living with HIV totaled 1, 250, 000 at the end of 2018. Meanwhile, the annual number of new HIV infection was nearly 80, 000. Therefore, HIV infection and AIDS are at a critical juncture [4].

Significant variations were found in HIV prevalence trends and routes of transmission in China. In some key regions, the incidence of HIV is high especially in Sichuan, Yunnan and Guangxi provinces [5], which represented most HIV diagnosis. Liangshan prefecture is located in the southwest of Sichuan province,

where is the region of drug trafficked route from the 'Golden Triangle' to western and central China [6]. It is also one of the world's largest illegal heroin production and distribution centers. The unique geographical position may serve a source for further spread of HIV in people of injection drug and drug trafficking than those in other area in China. Besides, the Liangshan autonomous prefecture is the largest Yi minority area in China, which accounts for more than 94.0% of newly infected HIV cases [7]. This area has become the region with the largest number of HIV carriers and AIDS patients in Sichuan province [8]. Now, the epidemic has spread to several counties in Liangshan prefecture. Some counties such as Butuo and Zhaojue were seriously threatened by HIV/AIDS [9]. Worst than that, the epidemic has spread to local general population through sexual transmission because of high rate of casual sexual behavior and low awareness of condom use [10, 11]. Therefore, if local residents were lack of information about HIV knowledge and prevention methods, they would be frail under the threat of HIV/AIDS. Currently, the information of the demographic characteristics, epidemic trends and influence factors of HIV/AIDS in Liangshan prefecture mainly came from the local AIDS prevention and control information system. These HIV prevalence rates are primarily derived from high risk groups such as injection drug users, thus little is known about the epidemic for local community residents. Whether these general population are familiar with HIV/AIDS related knowledge and prevention methods are important to be identified. Based on these reasons, we carried out a multicounty based large sample and cross-sectional HIV epidemic survey.

Methods

Study design, area and population

Liangshan prefecture is composed of 15 Yi ethnic counties, one Tibetan autonomous county and one capital city, Xichang. Considering of the large scale (>60, 000 km²) and population (> 4.73 million) of the study, it is difficult to survey all residents in the 17 counties. Therefore, we randomly sampled 50% of the counties (Puge, Yanyuan, Butuo, Ningnan, Zhaojue, Meigu, Mianning) from 15 Yi ethnic counties plus the capital city Xichang for this study. The method of stratified cluster sampling was conducted to select 5500 local community residents (age ≥ 14 years) in these eight counties from September 12, 2017 to October 23, 2018. All subjects were informed the general objectives of the research. Besides, questionnaires were issued anonymously and voluntarily to ensure the confidentiality of the information.

Questionnaire

Questionnaires used for this study were modified according to the WHO and AIDS program recommendation, related literature and Chinese cultural custom. Twenty-seven volunteers (11 Yi and 16 Han nationality) who mainly came from the Affiliated Hospital of Southwest Medical University (*N* = 3), the Second Hospital in Liangshan prefecture (*N* = 2), Chengdu First People's Hospital (*N* = 1), Puge County people's Hospital (*N* = 4), Yanyuan County people's Hospital (*N* = 2), the People's government of Zhaojue county (*N* = 1) as well as Xichang University (*N* = 14) were recruited to distribute 5500 questionnaires to seven counties. Considering the total amount of residents in Xichang city is larger than

other seven counties, 1300 copies of questionnaires were distributed to the capital city, Xichang, and 600 copies of questionnaires were distributed to each county. These questionnaires mainly contain demographic characteristics of respondents (gender, age, education level, marital status, location, race and economic condition), HIV/AIDS related basic knowledge, public awareness and attitude as well as prevention methods. All respondents should answer each item and choose “yes”, “no” or “uncertain” for HIV related knowledge and routes of transmission questionnaires, or either choose “yes” or “no” for the other questionnaires. Unified questionnaires were given out to the trained volunteers, and all questionnaire information were double checked and classified to ensure the quality control. Volunteers in each county/city also calculated the total amount of participants according to their choose “yes”, “no” or “uncertain” for each item. This study was approved by the Medical Ethics Committee of the Affiliated Hospital of Southwest Medical University.

Data analysis

Data analysis were performed using statistical package for the Social Sciences, version 17.0 (SPSS, Inc., Chicago, IL). Seven counties were randomly selected with the use of the “random sample selection” module in statistical analysis. The chi-square (χ^2) test was used to examine differences in HIV/AIDS related knowledge level by age, gender, education level, marital status, residence (rural or urban), race and economic condition. Those questionnaires either without choosing each item completely or missing basic information were be discarded. *P* value of less than 0.05 was used as the cut-off value for statistical significance.

Results

Demographic characteristics

5500 respondents participated in the study and 5091 respondents' questionnaires were effective. The validity rate of the questionnaire was 92.6%. There were 43.2% males and 56.8% females with an average age of (33 ± 17.6) and (31 ± 15.6), respectively. Ethnicity was dominated mainly by Han (53.0%) and Yi (41.7%) nationalities. 53.6% of the respondents were married or living together, while 46.4% of the respondents were unmarried or divorced. The educational level of most respondents was illiteracy to primary school (32.6%) or middle school (30.7%). Also, 56.1% of the respondents lived in urban area and 43.9% of the respondents lived in rural area. And 54.2% of the respondents had fixed work or income. Further descriptions of the demographic characteristics were shown in Table 1.

HIV/AIDS related basic knowledge and routes of transmission

The overall awareness about HIV/AIDS knowledge, routes of transmission, attitudes and prevention methods in general population is unsatisfactory. Only 65.8% of the respondents gave correct responses to all questions. Obviously, low ratio of correct answers was related to those respondents who answered “no” or “uncertain”. 23.0% of the respondents were unsure that drug abuse, occasionally sexual behavior, multiple sexual partners and homosexual behavior would increase the risk of HIV infection. And thus, the rate of totally correct answers for this item was the lowest (69.8%). Meanwhile, 18.1% and 17.7% of the respondents still falsely believed that “shaking hands and courtesy kisses with HIV infected people”, and “mosquito bites” would increase the likelihood of HIV infection. Similarly, 24.7% of the respondents did not believe the correct use of condoms would reduce the risk of HIV infection, as shown in Fig. 1.

The impact of demographic characteristics on HIV/AIDS related basic knowledge and routes of diffuseness was shown in Table 2. Compared with those younger respondents aged from 14 to 25, most older respondents were well aware of HIV/AIDS related basic knowledge and routes of diffuseness ($\chi^2 = 162.3, P < 0.001$). Similarly, females or urban respondents had more knowledge on HIV/AIDS than males ($\chi^2 = 7.544, P = 0.006$) or rural respondents ($\chi^2 = 29.44, P < 0.001$). About the educational level, the total percentage of the correct answers is significantly positive with the educational background. Those respondents with junior college or higher level were significantly superior to those people whose educational level was illiteracy to primary middle school ($\chi^2 = 88.13, P < 0.001$). Significant differences were observed in race and economic condition with the HIV/AIDS related basic knowledge. Compared with Yi minority respondents, Han respondents were more familiar with HIV/AIDS related basic knowledge ($\chi^2 = 24.63, P < 0.001$). Besides, those respondents with fixed work or income were also more familiar with HIV/AIDS related basic knowledge ($\chi^2 = 23.63, P < 0.001$). On the contrary, no significant differences were found between the unmarried or divorce respondents and the married or living together respondents ($\chi^2 = 2.824, P = 0.093$).

In general, the awareness of HIV/AIDS related knowledge of the respondents in Xichang city was more than the other seven counties with a total correct answer rate of 83.8%. On the contrary, the total correct answer rate of Meigu county, Zhaojue county and Butuo country were less than 60.0%. Butuo county was the lowest with a total correct answer rate of 48.2% , as shown in Fig. 2.

Attitudes and beliefs about HIV infection and AIDS

The positive answer rate of respondents for HIV/AIDS attitudes varied from 33.0% to 80.3%, as showed in Table 3. More than half of the respondents did not mind learning and working as well as having dinner with HIV carriers and AIDS patients. Nearly 80.0% of the respondents believed that people with HIV infection had the right to study and work normally, and their privacy should be protected. However, only 43.6% of the represents did not mind their children being in contact with HIV carriers and AIDS patients. Also, only 60.1% of the represents were willing to promote the prevention of HIV infection. Unfortunately, 33.0% of the represents wanted to have a child even though their spouse were infected with HIV. Worst than that, suicidal ideas emerged in 39.9% of the represents if the HIV test results were positive.

Prevention methods for reducing HIV infection

Of all prevention methods, more than 90% of the respondents approved “not sharing needles for drug abuse”, “reducing unnecessary blood transfusion” and “the establishment of files for HIV infected pregnant women and follow up”. These methods were helpful to prevent HIV infection. More than 85.0% of the respondents also approved the prevention of HIV infection from mother to child and the distribution of self-help condoms in public places. However, 22.0% of the respondents were not aware of the abstinence, being faithful and using condom (ABC) prevention method. Meanwhile, 32.6% of the respondents did not use condom during sexual intercourse. Additionally, 19.9% of the respondents did not approve to set up files for HIV/AIDS cases and drug users and follow up. At the same time, 26.9% of the respondents did not approve to encourage free HIV screening, as shown in Table 4.

Discussion

HIV/AIDS related knowledge is crucial to prevent and avoid potential HIV infection. This study, to the best of our knowledge, enrolled large samples and multicounty based cross-sectional study to assess HIV/AIDS related knowledge, attitudes and prevention methods in a general population in Liangshan prefecture. The overall correct rate of HIV/AIDS related knowledge was higher than that in a previous study based on only one county from Liangshan prefecture [12]. The improved knowledge about HIV and AIDS may be related to the increasing public propaganda and education by government, Center for Disease Control (CDC) and medical workers for local residents. Even so, we found a few respondents were uncertain about high risk factors of HIV infection such as injection drug abuse [13], occasionally sexual behavior [14], multiple sexual partners and homosexual behavior. Meanwhile, a few participants still falsely believed that “mosquito bites” would increase the risk of HIV infection. Therefore, this study indicates that transmission route of HIV is still an important public health issue that needs to be urgently addressed. Meanwhile, more HIV/AIDS-related public health interventions are needed to facilitate reduction and eventual elimination of HIV/AIDS-related high risk factors in these populations.

Our finding also indicated that HIV/AIDS related knowledge was associated with the composition of gender, race, age, education level, location and economic condition of local residents. Higher level of HIV/AIDS knowledge awareness were observed among female participants. It was possible that female participants were more aware of their responsibilities as a mother. Hence, they participated in study of HIV prevention more actively. The other reason may be that these females were more likely to be targeted for government-sponsored HIV education and intervention programs when they were pregnant, and hence their HIV knowledge increased [15, 16]. Besides, our findings indicated that Yi ethnic respondents presented low level of HIV/AIDS knowledge and awareness as compared to Han participants. Previous study pointed out Yi minority had early sexual beginning, casual sex behaviors and tolerant attitudes towards premarital sex when compared with Han nationality in Liangshan prefecture [17]. Potential explanation was that these conceptions were connected with local male chauvinism, unique regional custom and culture of Yi people, and consequentially resulted in the ignorance of HIV related knowledge. Therefore, these results may also explain why there was higher HIV infection rate of Yi minority in

Liangshan prefecture [18,19]. Besides, those objects aged more than 25 years old gained a better understanding of HIV/AIDS related basic knowledge and routes of transmission when compared with younger participants ($14 \leq \text{age} < 25$). This result is consistent with a previous study that young people aged between 14 and 25 had a higher incidence of HIV infection [20]. On the other hand, the education level and residence location of the residents are key factors to influence HIV/AIDS related knowledge. Those residents coming from rural or educational level was illiteracy to primary middle school, have less access to various HIV-related resources including the information, the access to condoms, and other harm reduction materials and practices. Therefore, it is urgent to strengthen the popularization of AIDS knowledge and interventions for these groups.

A significantly geographic variation in HIV/AIDS epidemic was observed in this study. Obviously, HIV/AIDS related knowledge of the residents in Xichang city was more than that in the other seven counties, especially in Meigu, Zhaojue and Butuo. A potential reason was that residents in Xichang, the capital city, are easier to get public action for drug awareness, AIDS knowledge and behavior intervention by both government and CDC. This finding confirms that drug abuse and drug trafficking among Yi ethnic areas, especially for Meigu, Zhaojue and Butuo, have not abated but in fact remains constant. Additionally, these findings may also explain the high new infection rate of HIV in Meigu, Zhaojue and Butuo counties [9]. Therefore, these variations created a considerable challenge for Chinese public health workers and policy makers in designing effective HIV prevention and control programs.

Correct and consistent condom use is important to prevent HIV infection effectively [21]. Whereas, about one-third represents still gave up condom use in this study. One possible reason was that condom use was considered as birth control, which was not consistent with traditional idea of having a growing family of Yi nationality [22]. The other reasons may be related with the inherited heavy consciousness of male chauvinism, stigma and discrimination against HIV/AIDS [23]. These reasons may also explain about 40% of the participants emerged suicidal ideas and more than one quarter participants wanted to have a child even if their spouses were infected with HIV. The encouragement of free HIV screening is also an effective measurement to prevent and control HIV infection. However, knowledge on blood testing is misunderstood especially for Yi ethnic people. More work needs to be done to encourage and publicize HIV screening among local residents. Additionally, condom use should be promoted not only for extramarital sex, but also for marital sex and should not be limited to HIV-discordance couples but to all couples who are not currently planning to have a child.

Several limitations need to be considered when interpreting the findings. Firstly, we only recruited 5500 respondents from 50% randomly selected counties and one capital city in Liangshan prefecture. Consequently, HIV/AIDS knowledge, attitude and prevention methods of residents from the other counties were not investigated, and potential bias may not be representative for the general population in Liangshan prefecture. Additionally, information were collected through self-report by participants and the results may be influenced by local social desirability bias. Despite these limitations, this study provides preliminary data for future research and interventions of HIV/AIDS knowledge, attitude and prevention methods of residents in Liangshan prefecture.

Conclusions

A relatively low level of HIV/AIDS knowledge and routes of transmission among local residents were observed in Liangshan prefecture. The results of our study provide data to promote targeted prevention for improving HIV/AIDS related knowledge and reducing high risk factors of HIV infection for local residents in Liangshan prefecture in the future.

Abbreviations

HIV: human immunodeficiency virus; AIDS: Acquired Immune Deficiency Syndrome; ABC: abstinence, being faithful and using condom; CDC: Center for Disease Control

Declarations

Acknowledgments

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Availability of data and materials

The data sets generated during the current study are not publicly available. However, the data sets used and/or analyzed during the current study will be made available from the corresponding author on reasonable request.

Authors' contributions

GT and QW designed the study and drafted the manuscript. ZZ, JL, GL, SW and FH participated in epidemiological investigation, data collect and analysis. JL revised the manuscript. All authors have read

approved the final manuscript.

Ethics approval and consent to participate

This study was approved by the Medical Ethics Committee of the Affiliated Hospital of Southwest Medical University (approval number KY2017003). Written informed consent was obtained from each study participant or their parents for students younger than 18 years before data collection and documented in prepared format.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Author details

¹Department of Laboratory Medicine, Affiliated Hospital of Southwest Medical University, Luzhou 646000, China. ²Department of Laboratory Medicine, the Second Hospital in Liangshan prefecture, Xichang, China. ³Department of Pathology, Affiliated Hospital of Southwest Medical University, Luzhou, China. ⁴Department of Laboratory Medicine, Chengdu First's Hospital, Chengdu, China. ⁵Sichuan Provincial Center for Gynaecology and Breast Diseases (Affiliated Hospital of Southwest Medical University), Luzhou 646000, China.

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Tables

Table 1 Demographic characteristics of the participants (N= 5091)

Characteristics	N(5091)	%
Age (years)		
14~25	2081	40.9
25~40	1901	37.3
40~	1109	21.8
Gender		
Male	2199	43.2
Female	2892	56.8
Education level		
Illiteracy to primary school	1658	32.6
Middle school	1561	30.7
High school	1079	21.2
toto high school (1496)		
Junior college or higher	793	15.6
Marital status		
Unmarried or divorce	2360	46.4
Married or living together	2731	53.6
Residence		
Urban	2856	56.1
Rural	2235	43.9
Ethnicity		
Han	2700	53.0
Yi	2124	41.7
Others	267	5.24
Fixed work or income		

Yes	2759	54.2
No	2332	45.8

Table 2 The impact of demographic characteristics on HIV/AIDS related basic knowledge and routes of diffuseness.

Project	HIV/AIDS related basic knowledge and routes of transmission			
	Correct (N)	Correct (%)	(2)	P-value
Age				
14~25 (2081)	1209	58.1	162.3	<0.001
25~40 (1901)	1457	76.6		
40~ (1109)	785	70.8		
Gender				
Male (2199)	1397	63.5	7.544	0.006
Female (2892)	1944	67.2		
Education level				
Illiteracy~primary school (1658)	972	58.6	88.13	<0.001
Middle school (1561)	1009	64.6		
High school (1079)	751	69.6		
toto high school (1496)				
Junior college or higher (793)	609	76.8		
Marital status				
Unmarried or divorce (2360)	1540	65.3	2.824	0.093
Married or living together (2731)	1843	67.5		
Location				
Urban (2856)	1971	69.0	29.44	<0.001
Rural (2235)	1380	61.7		
Race				
Han (2700)	1861	68.9	24.63	<0.001

Yi (2124)	1323	62.3		
Others (267)	167	62.5		
Economic condition				
Fixed work or income (2759)	1898	68.8	23.63	<0.001
No (2332)	1453	62.3		

Table 3 Percentage of positive answer for HIV infection and AIDS (N = 5091, %)

Attitudes for HIV infection and AIDS	Positive (N)	%
Do not mind learning or working with HIV carriers and AIDS patients	3308	65.0
Do not mind having dinner with HIV carriers and AIDS patients	2843	55.8
People infected with HIV and AIDS patients have the right to study and work normally	4090	80.3
The privacy of HIV carriers and AIDS patients should be protected	4067	79.9
Do not mind their children who are in contact with HIV carriers and AIDS patients	2218	43.6
As a volunteer to promote the prevention of HIV infection	3061	60.1
If you are infected by HIV or AIDS patients, you will ask for help for your family members in time	3562	70.0
Do you want to have a child even though your spouse was infected with HIV	1679	33.0
Do you have a suicidal idea if your HIV test result is positive	2031	39.9

Table 4 Prevention methods for reducing HIV infection (Approved number and percentage, %)

Policies	Number(N)	%
Not sharing needles for drug abuse	4826	94.8
Abstinence, being faithful and condom (ABC) prevention method	3972	78.0
Reduce unnecessary blood transfusion and injection	4599	90.3
Prevention infection from mother to child	4337	85.2
Use condom during sexual intercourse	3431	67.4
Prevention and control sexually transmitted infections (STIs) promptly	4077	80.1
Avoid illegal blood donation	4385	86.1
Not sharing brush or shaver with a HIV infected person	3982	78.2
Establish files for HIV/AIDS cases and drug users and follow up	3977	78.1
Invite professors from the Centers for Disease Control and Prevention (CDC) to popularize HIV infection related prevention knowledge	4101	80.6
Invite doctors to analyze typical cases of AIDS related death	4217	82.8
Posting bilingual (Han and Yi ethnic) AIDS awareness in public place	4033	79.2
Encourage free HIV screen	3719	73.1
Distribute self-help condoms in public places	4372	85.9
Establish files for HIV infected pregnant women and follow up	4729	92.9

Figures

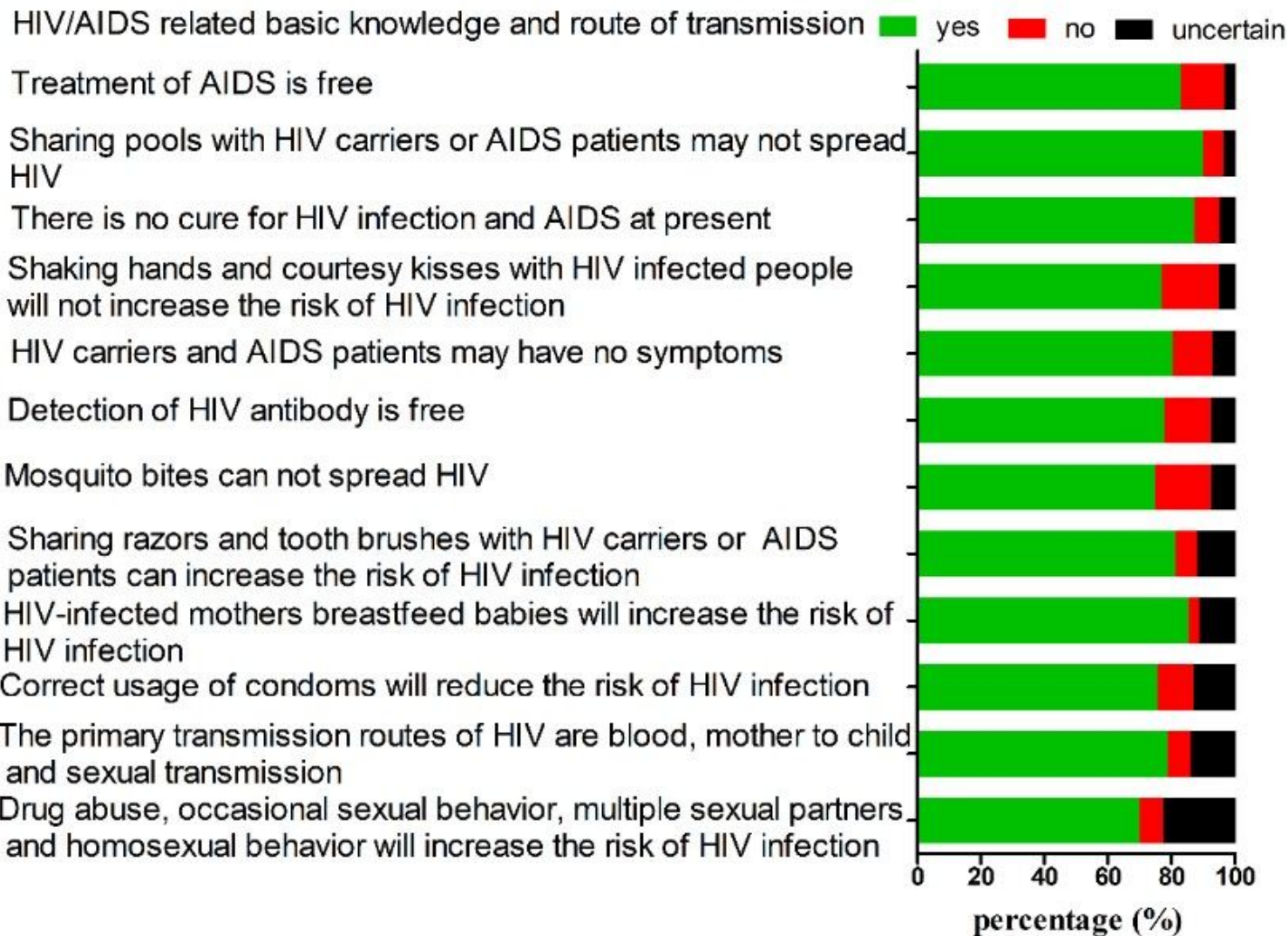


Figure 1

HIV/AIDS related basic knowledge and routes of transmission.

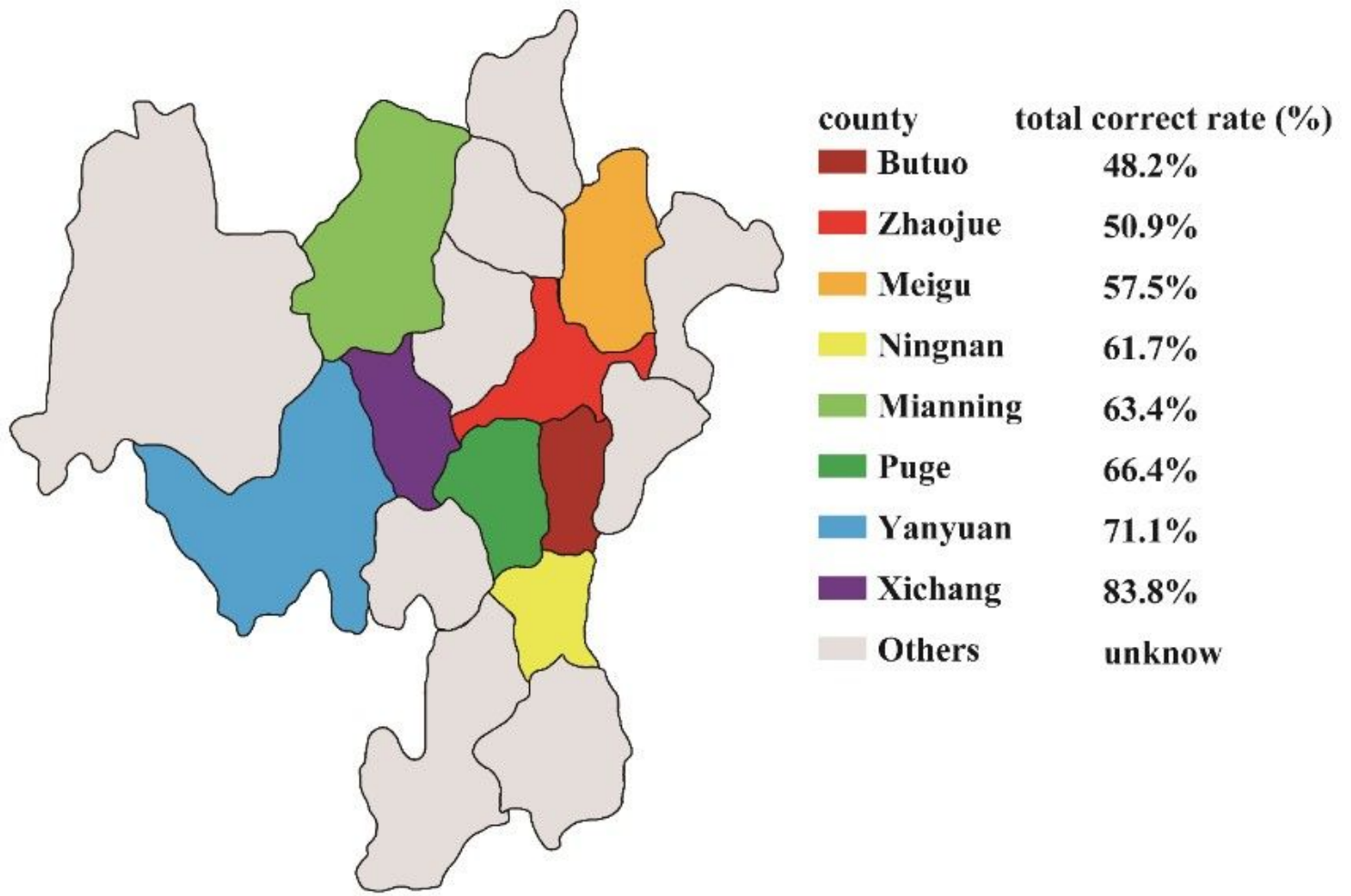


Figure 2

The total correct percentage of HIV/AIDS related basic knowledge in each county (N= 5091, %).

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [STROBEchecklistcrosssectional.doc](#)