

An Investigation of AIDS-related Knowledge-Attitude-Practice and Analysis of Influencing Factors Among Students in China

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Research

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Abstract

Background: With the increasing number of HIV infected students in China, it is necessary to investigate AIDS-related knowledge-attitude-practice among students, which is helpful to formulate effective AIDS health education measures for students.

Methods: A cross-sectional study was conducted with students aged 15-24 years. University college students (n=1,744) were surveyed with a sampling in western China. The data were collected from May to November 2019 through both face-to-face and online survey. Data were analysed using logistic regression and multiple regression analysis.

Results: A total of 1,744 questionnaires were included in the data analysis, including 890 females (51.0%), with a mean age of 19.43 (± 1.27) years; 344 (19.7%) of students knew that the effective time for post-exposure prophylaxis (PEP) was within 72 hours. The influencing factors of AIDS discrimination of students included gender, residential area, education and major; 235 (13.5%) students reported having had sex; 38 reported having had commercial or temporary sexual partners and most (n=31) of these were males; 131 (56.5%) students reported never or sometimes used condoms during sex.

Conclusions: The awareness rate of AIDS among students in west China is low; especially the awareness rate of PEP is the lowest. Condom use is low among students, who look for sexual partners through the Internet; men are more likely than women to engage in risky sexual behavior. The results of this study show that AIDS knowledge is not sufficient to change the attitudes and behaviors of students. However, AIDS health education is an important means to prevent and control AIDS, and more contact to people living with HIV may help reduce AIDS discrimination.

Background

In recent years, HIV global prevalence has leveled and the incidence of new infections has declined, but the number of HIV infections among young people aged 15–24 keeps rising. There were approximately 3.5 million cases of HIV infection among people aged between 15 and 24 internationally, and approximately 30% of new infections occur in this age group [1]. In 2018, China reported 16,000 cases of people aged 15–24 infected HIV [2]. The United Nations Children's Fund (UNICEF) predicts that at current HIV prevalence rates, without intervention, 2 million people in this age group will be at risk of becoming newly infected and 360,000 will die from HIV infection between 2018 and 2030 [3]. HIV prevention and control among young people aged 15–24 has become a priority.

Studies have shown that providing children and adolescents with information about sexual and healthy behaviour helps them to protect themselves from HIV infection [4, 5]. Globally, people aged 15–24 lack AIDS knowledge [6]. To curb the spread of AIDS and keep the epidemic at a low level; the National Health Commission of the People's Republic of China required that the awareness rate of AIDS knowledge should reach over 95% [7]. A related survey showed that the awareness rate of AIDS knowledge among students was 81.7% in west China [8], which was far lower than the national standard. Therefore, it is

necessary to investigate AIDS knowledge among students, to formulate effective AIDS health education measures for students in China.

Due to the incurable nature of HIV and its potentially fatal consequences, people have a great prejudice against people who have it. It is widely believed that people living with HIV (PLWH) should be blamed, punished, condemned and responsible for HIV infection [9]. Current stigma and discrimination against PLWH have been recognized as one of the main obstacles to controlling the HIV epidemic [10]. Most people avoid testing after high-risk behaviors because they are worried that the results will be positive, and they will have to face discrimination accompanied by diseases [10–12]. The consequence of discrimination is to promote the spread of HIV, so reducing the stigmatization of AIDS is essential to eventually end the AIDS epidemic by 2030.

University students are a special risk group for acquiring sexually transmitted diseases (STDs). Alcohol, drugs and unprotected sexual behaviors increase the possibility of HIV infection [13]. The health risk behavior is one of the leading causes of morbidity and mortality among young people and adults in the United States, and more adolescent students have risky sexual behavior associated with unwanted pregnancy and sexually transmitted infections such as HIV [14]. According to the monitoring report of dangerous behaviors of American youth showed that 39.5% of students had sex and 9.7% had sex with four or more people among 10–24 years old students [15]. With the liberalization of sexual concepts and behaviors of Chinese students, approximately 75% of Chinese teenagers agree with premarital sex, and approximately 27% of college students have sexual activity; sexual behavior tends to begin at younger ages [16]. Therefore, it is necessary to educate students about sexual behavior.

Methods

Design

Cross-sectional study and convenience sampling were used. The students involved in the survey were from two universities and two colleges in west China.

Measurements

The questionnaire consisted of four parts:

The first part was related to the basic attributes of the respondents, including gender, age, ethnic, education, grade, and major.

The second part inquired about AIDS-related knowledge, based on the questionnaire of AIDS knowledge among students of *The National Protocol of AIDS Surveillance (2017 Edition)* with eight items, in addition, two items “the best time for PEP is within 2 hours” and “the effective time for PEP is within 72 hours” were added to the questionnaire, with a total of ten items. Of the eight questions on AIDS-related knowledge of *The National Protocol of AIDS Surveillance*, one point was awarded for each correct answer

and zero points for incorrect answers; with a total score greater than or equal to six points to be qualified [17].

The third part was the Chinese version of Zelaya's HIV/AIDS Stigma Scale [18]. The scale includes 24 items, of which item 13, 14, 15, 17, 18 and 20 were forward scored, and the rest were reverse scored. The answers were rated from 1 to 5, from "strongly agree to strongly disagree". The Scale Content Validity Index Average (S-CVI/Ave) was 0.97; the Cronbach's alpha value of four subscales were ranged from 0.794 to 0.905.

The fourth part was the AIDS-related sexual behaviour questionnaire, including whether or not having had sex; whether chatting with strangers on the Internet about private topics; and whether accepting to have sex with online friends, with a total of 10 questions.

Data collection method

Both face-to-face survey and on-line survey were used. For the face-to-face survey, six trained investigators explained the purpose and significance of the survey to students and administered questionnaires, with the consent of the respondents and the head teachers. Regarding the on-line survey, Questionnaire Star, a Chinese online survey tool was used, excluding the classes which participated in the face-to-face survey. After obtaining informed consent, the link of the survey was distributed by the head teachers to the students. This questionnaire could only be accessed through the web site and was not allowed to be retrieved by search engine; each device (mobile phone, computer) or each account could only be used once.

Data analysis

This data were analysed using SPSS 23.0 statistical package. Data entry adopted a two-person input mode to ensure the reliability and accuracy of data. Questionnaires with more than 20% missing items were deleted. Descriptive statistical analysis, chi-square test, t-test, one-way ANOVA and regression analysis were applied. First, chi-square test was used to examine the awareness rate of AIDS knowledge and the incidence rate of sexual behavior among students; then the score of the Chinese version Zelaya's HIV/AIDS Stigma Scale was analyzed by independent sample t-test or one way ANOVA; finally, logistic regression analysis was used to explore the influencing factors of AIDS knowledge and sexual behavior, and multivariate regression analysis was used to explore the influencing factors of AIDS discrimination among students.

Ethics consideration

Participation was anonymous, voluntary and did not involve any psychological and physical injuries. Ethical approval was granted by the ethics committee of the Southwestern Medical University, in China (20190321-6). An informed consent statement was provided to online survey participants and face-to-face respondents, which clearly outlined the rights to confidentiality of their data and their right to withdraw from the study.

Results

The demographics

Data were collected from May to November 2019. A total of 1,300 questionnaires were distributed in the face-to-face survey; 1,051 students responded, with a response rate of 80.8%; 207 invalid questionnaires were excluded and 844 remained; 1,176 online questionnaires were collected from 1,546 potential respondents with a response rate of 76.1%; 276 invalid questionnaires were excluded (no changes in response) and 900 remained. Therefore, a total of 1,744 questionnaires were included in the analysis including 890 females (51.0%) and 854 males (49.0%), aged 19.43 (± 1.27). Respondents with different attributes were analyzed in subgroups (Table 1).

Table 1
Demographic information (n = 1744)

Project	Frequency	Percentage
Gender		
Male	854	49.0
Female	890	51.0
Ethnic		
Han Nationality	1680	96.3
Minority	64	3.7
Education		
Junior college	1076	61.7
Undergraduate	668	38.3
Grade		
Junior	721	41.3
Senior	1023	58.7
Major		
Science	806	46.2
Liberal arts	660	37.8
Medical	278	15.9
Whether the one-child		
Yes	632	36.2
No	1112	63.8
Residential area		
Rural	998	57.2
Urban	746	42.8
Relationship with classmates		
Very good	392	22.5
Quite good	1002	57.5
Average	344	19.7
Quite bad	3	0.2

Project	Frequency	Percentage
Very bad	3	0.2
Relationship with parents		
Very good	716	41.1
Quite good	730	41.9
Average	278	15.9
Quite bad	15	0.9
Very bad	5	0.3

The awareness rate of AIDS knowledge

The awareness rate of AIDS knowledge among students in this study was 84.9%. The item with the highest awareness rate (94.5%) was "we should actively seek AIDS testing and consultation after the occurrence of high-risk behaviors". But for the high-risk behavior, the awareness rate of time to take antiviral blockers was low; 31.2% of students knew that the best time for PEP is within 2 hours; only 19.7% of students knew that the effective time for PEP is within 72 hours. Chi-square test showed that the awareness rate of AIDS knowledge among students was related to gender, education, grade, major, whether from one child family, residential area, and the relationship with their classmates ($P < 0.050$). There was no significant difference from ethnic and relationship with parents ($P > 0.050$).

The logistic regression analysis showed that the influencing factors for AIDS knowledge in students included gender, major and grade ($P < 0.050$). There was no significant difference between education, whether the one child, residential area, and their relationship with their classmates ($P > 0.050$). The awareness rate of AIDS knowledge of males was 1.552 times more than that of females (OR = 1.552, $P = 0.010$); the awareness rate of AIDS knowledge of medical students was 4.238 times more than that of Liberal Arts Students (OR = 4.238, $P < 0.001$); the awareness rate of AIDS knowledge among the lower grade students was 0.471 times less than that of the Higher Grade Students (OR = 0.471, $P < 0.001$) (Table 2, 3).

Table 2
Variable assignment specification

Factor	variable name	Assignment description
AIDS awareness	Y ₁	0 = Yes, 1 = No
Discrimination score	Y ₂	Measured value
Sexual behavior	Y ₃	1 = Yes, 2 = No
Gender	X ₁	1 = Male, 2 = Female
Education	X ₂	1 = College, 2 = Undergraduate
Grade	X ₃	1 = Junior, 2 = Senior
Major	X ₄	1 = Science, 2 = Medical, 3 = Liberal arts
Whether the one-child	X ₅	1 = Yes, 2 = No
Residential area	X ₆	1 = Rural, 2 = Towns
Relationship with classmates	X ₇	1 = Very good, 2 = Quite good, 3 = Average, 4 = Quite bad, 5 = Very bad

Table 3
Logistic regression analysis of awareness rate of AIDS knowledge (n = 1744)

	<i>B</i>	<i>S.E</i>	<i>Wald</i>	<i>P</i>	<i>OR</i>	<i>95% CI</i>
Gender						
Male	0.440	0.171	6.613	0.010	1.552	1.110–2.170
Female	-	-	-	-	-	-
Major			19.212	< 0.001		
Science	0.382	0.206	3.441	0.064	1.465	0.979–2.192
Medical	1.444	0.331	19.054	< 0.001	4.238	2.216–8.105
Liberal arts	-	-	-	-	-	-
Grade						
Junior	-0.753	0.175	18.485	< 0.001	0.471	0.334–0.664
Senior	-	-	-	-	-	-
Constant	1.623	0.171	89.768	< 0.001	5.069	

The scores of Zelaya's HIV/AIDS stigma scale

This investigation showed that the average score of Zelaya's scale was 2.366 (± 0.562). The mean scores of the four dimension, fear of transmission and disease; association with shame, blame and judgment; personal support of discriminatory actions or policies; perceived community support of discriminatory actions or policies were: 2.722 (± 0.931); 2.190 (± 0.765); 2.295 (± 0.734); and 2.264 (± 0.754), respectively.

The multiple linear regression analysis showed that gender, residential area, education and major were the influencing factors of Zelaya's HIV/AIDS stigma scale. The influence of grade and relationship with classmates on Zelaya's HIV/AIDS stigma scale was not statistically significant. The overall test of multiple linear regression analysis has statistical significance ($F = 8.824$, $P < 0.001$), which explains the 4.9% variation of AIDS discrimination (Table 2, 4).

Table 4
Multivariate regression analysis of score of Zelaya's scale (n = 1744)

Dependent variable	Independent variable	Regression coefficients	Standard regression coefficient	<i>t</i>	<i>P</i>
Discrimination score	Gender	-2.442	-0.091	-3.174	0.002
	Residential area	-1.507	-0.055	-2.188	0.029
	Education	2.875	0.104	2.739	0.006
	Major				
	Science	7.203	0.267	6.533	< 0.001
	Liberal arts	8.437	0.303	6.218	< 0.001
F = 8.824, $P < 0.001$, $R^2 = 0.049$, $\text{adj}R^2 = 0.043$					

AIDS-related sexual behavior

Students (235; 13.5%) reported having had sex; 125 (7.2%) students reported having found sexual partners through social networks; 38 (16.5%) reported having had commercial or temporary sexual partners, of which 31 were male; 131 (56.5%) reported never or sometimes used condoms during sex, with 105 males; the reported average age of sex debut was 17.71 (± 2.45). Chi-square test results showed that whether students had sex was related to gender, education, grade, major, residential area and AIDS discrimination ($P < 0.050$); there was no significant difference between the awareness rate of AIDS knowledge ($P > 0.050$).

The logistic regression analysis showed that the influencing factors of sexual behavior of students included gender, major, grade and AIDS discrimination ($P < 0.050$). There were no significant differences with education and residential area ($P > 0.050$). The male students who had sex were 3.824 times more than the female students ($OR = 3.824, P < 0.001$); and the junior students who had sex were 0.528 times less than the senior students ($OR = 0.528, P = 0.005$); the incidence of sexual behavior of medical students was 0.247 times less than that of liberal arts students ($OR = 0.247, P < 0.001$), and there was no significant difference between science students and liberal arts students; the incidence of sexual behavior of students with low discrimination on AIDS was 0.547 times less than those with high discrimination on AIDS ($OR = 0.547, P = 0.001$) (Table 2, 5).

Table 5
Logistic regression analysis of factors influencing students' sexual behavior (n = 1744)

	<i>B</i>	<i>S.E</i>	<i>Wald</i>	<i>P</i>	<i>OR</i>	<i>95% CI</i>
Gender						
Male	1.341	0.202	43.876	<0.001	3.824	2.571–5.687
Female	-	-	-	-	-	-
Grade						
Junior	-0.639	0.227	7.927	0.005	0.528	0.338–0.824
Senior	-	-	-	-	-	-
Major			19.139	<0.001		
Science	-0.155	0.249	0.386	0.534	0.857	0.526–1.395
Medical	-1.398	0.367	14.528	<0.001	0.247	0.120–0.507
Liberal arts	-	-	-	-	-	-
Discrimination score						
< 72	-0.604	0.184	10.759	0.001	0.547	0.381–0.784
≥ 72	-	-	-	-	-	-
Constant	-1.407	0.303	21.614	<0.001	0.245	

Discussion

Approximately 50% of the 1,744 students in this study lived in rural areas, which may reflect the current situation of students in western China. The main subjects of this survey were junior college students, who may have a relatively high HIV infection rate [19]; therefore, it was important to understand the AIDS-related knowledge-attitude-practice among students for a more effective AIDS health education.

Analysis on the level of knowledge about AIDS

The study found that most of participants had a good understanding of the knowledge that condoms can reduce the spread of AIDS and the need for counseling and testing after high-risk behaviors; this shows that young people in the region have a certain awareness of AIDS prevention and control. However, some studies have shown that most students evade HIV screening after high-risk behaviors due to fear of testing positive, and considering that HIV testing and counseling are neither necessary nor important [20]. This reveals that students' awareness of AIDS risks was inaccurate and their AIDS risk identification ability should be improved [21]. Our study found that students had the lowest awareness rate of PEP. It implied that students lack of comprehensive and up-dated AIDS-related knowledge, and AIDS health education needs to keep pace with the progress of AIDS research and treatment.

The results showed that females have a lower awareness rate of AIDS knowledge than males. In most developing countries, women are less educated and their access to sexual health education was often more limited than males, therefore they have little knowledge of AIDS and high susceptibility. In the United States, women account for approximately one-fifth of new HIV infections and 22% females expressed worry about HIV [22], which suggested that females should be more important targets for education and help. In different majors, the awareness rate of medical students was the highest [23], which may be related to the medical students' learning about AIDS in school. The awareness rate of AIDS among the senior students was higher than that among the junior students [23]. With the growth of grades, access to AIDS knowledge and the probability of AIDS awareness rate will also increase. This suggests that medical students may be developed as AIDS health education educators; the junior students should focus on AIDS health education.

Attitude of AIDS discrimination

The main reason for people's discrimination against AIDS is fear of HIV infection; however, the reason for people's fear of HIV is the lack of understanding of the essence of AIDS infection [24]. We should strengthen AIDS health education and inform people who are exposed to HIV in their daily lives that they will not be infected and that the HIV load in saliva and urine is very low [25]; thus reducing the fear of AIDS among students. Colins' study showed that AIDS knowledge is positively correlated with attitudes, and knowledge has a positive effect on attitudes [26]. However, our study showed that the influence of the awareness rate of AIDS knowledge on the score of AIDS discrimination was not statistically significant. This shows that AIDS knowledge alone may not affect students' discriminatory attitudes towards AIDS, and some more effective strategies are needed to change their attitudes.

In this study, females' discrimination against AIDS was less than males', which might relate to the fact that females were more tolerant than males [27]. Therefore, anti-discrimination education strategies should be developed in light of students' psychological characteristics of gender differences. Among different majors, medical students have the lowest score of HIV/AIDS discrimination, which may be related to the particularity of medical specialty. Medical students have more opportunities to contact

HIV/AIDS patients, which could reduce discrimination towards HIV/AIDS [28]. Therefore, frequent contact with people living with AIDS may help reduce discrimination against AIDS.

Analysis of AIDS-related sexual behavior

Results of this study showed that 235 (13.5%) students reported having sex, which was lower than that of Western countries—such as the United States [13-14]. The occurrence of sexual behavior may be related to the cultural differences in different countries. This study found that more than 50% of students who had sex did not insist on the use of condoms; actually, the correct use of condoms is one of the main ways to reduce the spread of AIDS [29]. However, young people use condoms more to prevent pregnancies than to prevent STD [30]. It reveals that students have a low awareness of the risk of AIDS infection. It is necessary to strengthen the correct application of condoms among young people to change the dangerous sexual behaviors of students and reduce the spread of AIDS.

The Internet was a platform for expanding contact with different sexual partners, which increases probability of sexual activity between strangers and the likelihood of unsafe sex, which leads to the transmission of sexually transmitted diseases to sexual partners [31,32]. In this study, 125 (7.2%) students sought sexual partners through social networks, which revealed that the Internet has become a popular way for young people to seek sexual partners in China. It suggests that the intervention of young people's network behavior is an important content of AIDS education. At the same time, the mode of AIDS health education should not be limited to the traditional mode; network education and prevention should be given more attention, which conforms to the characteristics of students.

AIDS health education for males is crucial. The males' sexual behavior was 3.824 times higher than that of females; and the males tend to have commercial or temporary sexual partners. It reveals that males were more active in sexual attitude and behavior; and the probability of high-risk behaviors was higher. The researchers found that males with knowledge of sexual and reproductive health reported that the age of first sexual intercourse may be delayed or contraceptive use increase during sexual intercourse [33]. This showed that AIDS health education has a positive impact on males.

The incidence of sexual behavior of senior students was higher than that of junior students; and the awareness rate of AIDS knowledge of senior students was higher than that of junior students; resulting in the separation of knowledge and behavior, which brought challenges to the prevention and control of AIDS among students. It revealed that AIDS knowledge among students was not sufficient to affect the change of behavior. So, the best educational methods should be explored according to their respective characteristics.

Research Limitations and Recommendations

The scope of this study is limited to west of China. We have not investigated other regions; and the study may not be representative beyond this area. It suggests that the scope of the study should be expanded, and a multi-center study should be conducted to improve the scientific nature of the study. The

multivariate linear regression model of AIDS discrimination has a low coefficient of determination, which indicated that the main factors affecting AIDS discrimination have not been found. This study involves the privacy issues related to sexual behavior; there may be retrospective information bias or avoidance awareness.

Conclusions

The awareness rate of AIDS among students in west China is low; especially the awareness rate of PEP is the lowest. Condom use is low among students, who find sexual partners through the Internet; and men are more likely than women to engage in risky sexual behavior. The results of this study show that AIDS knowledge is not enough to change the attitudes and behaviors of students. However, AIDS health education is an important means to prevent and control AIDS, and more contact to people living with HIV may help reduce AIDS discrimination.

Abbreviations

AIDS: Acquired Immune Deficiency Syndrome

HIV: Human Immunodeficiency Virus

PEP: Post-exposure prophylaxis

PLWH: People living with HIV

S-CVI/Ave: The Scale Content Validity Index Average

STDs: Sexually transmitted diseases

UNICEF: The United Nations Children's Fund

Declarations

Ethics approval and consent to participate

Ethical approval was granted by the research ethics committee of the Southwest Medical University, in China (20190321-6).

Consent for publication

Informed consent was obtained from all individual participants included in the study (Participants under the age of 18 obtained informed consent from themselves and their guardians).

Availability of data and material

The datasets generated and/or analysed during the current study are not publicly available due involves participants' privacy but are available from the corresponding author on reasonable request.

Competing interests

All the authors do not have any possible conflicts of interest.

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Authors' contributions

XH contributed to the conception of the study, performed the data analyses and wrote the manuscript. WJ and TJ contributed significantly to analysis and manuscript preparation. XL and XL contributed data collection. YH helped perform the analysis with constructive discussions and supervised the study.

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