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Abstract

Background Transgender women (TGWs) constitute one of the key populations for HIV prevention and control and constitute a high-risk group due to a lack of health services. The aim of this study was to investigate knowledge, attitudes and practices (KAPs) related to HIV and knowledge access and needs amongst transgender women in Chongqing, China.

Methods A cross-sectional study was conducted from October 2022 to March 2023. A total of 128 self-identified TGWs were recruited in Chongqing, China, via snowball sampling, and a KAP-related questionnaire was completed via Questionnaire Star.

Results For the 128 TGWs surveyed effectively, the total knowledge of AIDS-related knowledge was 82.03%, with significant differences in age, education level, marital status, occupation and average monthly income ($p < 0.05$).

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Survey instruments and scoring methods

e survey was conducted from October 2022 to March 2023. Using the snowball sampling method, an online questionnaire in the form of collected questionnaires was employed. e quality of the collected questionnaires was reviewed, and the data were normalised. Responses with complete information that did not contain logical errors were regarded as valid. A total of 131 questionnaires were collected, amongst which 128 questionnaires were valid.

e collection of literature related to TGW at home and abroad [3, 4, 13, 14] was based on the internationally recognised guidelines for constructing the core indicators of the Common Declaration on HIV/AIDS (CDA) on issues in the indicators of the United Nations Special Session [15], combined with the KAP theory to prepare

Table 1 Demographic information of the subjects

Variables	Frequency *n* (%)
Age (year)	
18–24	64 (50.00)
25–34	47 (36.72)
Over 35	17 (13.28)
Domicile	
Cities and towns	97 (75.78)
Countryside	31 (24.22)
Nation	
Han ethnic group	119 (92.97)
Other	9 (7.03)
Educational level	
Junior high school and below	13 (10.16)
High school or secondary school	26 (20.31)
College or university degree	82 (64.06)
Postgraduates	7 (5.47)
Marital status	
Cohabitation	5 (3.91)
Unmarried	108 (84.38)
Marriage	5 (3.91)
Divorcee	9 (7.03)
Bereaved of one's spouse	1 (0.78)
Careers	
Full-time regular work	49 (38.28)
Part-time work	28 (21.88)
Student	37 (28.91)
Unemployed	14 (10.94)
Average monthly income (yuan)	
<3,000	14 (10.94)
3,001–5,000	38 (29.69)
5,001–8,000	20 (15.63)
>8,000	18 (14.06)
No income	38 (29.69)

Table 2 Knowledge of AIDS-related knowledge amongst TGW

Title	Correct answer	Knowledge *n* (%)
Can a person infected with AIDS be seen from his appearance?	No	88 (68.75)

the participants was concentrated in colleges or undergraduate degrees (64.06%), and their marital status was mainly unmarried (84.38%). e participants had mainly had full-time regular jobs (38.28%), followed by students (28.91%). An average monthly income of 3001–5000 yuan and 'no income' both accounted for 30.00%. e details are shown in Table 1.

TGW AIDS-related knowledge

Eight questions were asked about AIDS. e answers to these questions are shown in Table 2. e question with the lowest percentage of correct answers was 'Can a person infected with HIV be seen from his or her appearance?', with a 68.75% rate of correct answers. e question with the highest percentage of correct answers was 'Is it possible to get AIDS by sharing syringes with HIV-infected people?', with a 97.66% rate of correct answers.

Comparison of TGW HIV knowledge by demographic characteristics

e total HIV knowledge score of the subjects was 6.77 ± 1.47 (95% CI: 3.89–9.65) (range: 0–8) (Table 3). A comparison of TGW HIV-related knowledge by di erent demographic characteristics is shown in Table 4. e awareness rate of TGW AIDS-related knowledge was 82.03%, and the di erences in age, education level, marital status, occupation and mean monthly income were statistically signi cant ($p < 0.05$). e knowledge rate of the subjects aged 18–24 years was higher than that of the other age groups. e older the individual is, the lower the knowledge rate. In terms of education, the knowledge rate of the participants with a college degree or undergraduate degree was higher than that of the other education levels. e knowledge rate of the participants with junior high school education or below was obviously lower. In terms of marital status, the knowledge rate of the cohabiting and widowed participants was 100%, which was higher than that of the other marital statuses. In terms of occupation, the awareness rate of the students was 100%, which was higher than that of the other occupations. In terms of average monthly income, the knowledge rate of the participants with an average monthly income of 5,001–8,000 yuan was higher than that of the other income groups, and the knowledge rate

of the participants with an average monthly income of 3,001–5,000 yuan was signi cantly lower.

TGW AIDS-related attitudes

Table 6 TGW AIDS-related attitudes scores for di□erent demographic characteristics (mean ± SD)

Variables	Personal attitude	t/F	*p*	Subjective attitude	t/F	*p*
Age (year)		0.269	0.765		0.416	0.660
18–24	9.02 ± 2.19			5.28 ± 0.88		
25–34	8.91 ± 2.60			5.38 ± 0.80		
Over 35	8.53 ± 2.79			5.18 ± 0.88		
Domicile		8.040	0.005		0.018	0.893
Cities and towns	9.25 ± 2.22			5.30 ± 0.84		
Countryside	7.87 ± 2.73			5.32 ± 0.87		
Nation		0.364	0.548		0.011	0.917
Han ethnic group	8.95 ± 2.37			5.30 ± 0.83		
Other	8.44 ± 3.13			5.33 ± 1.12		
Educational level		5.585	0.055		3.018	0.032
Junior high school and below	7.46 ± 2.70			4.85 ± 0.99		
High school or secondary school	7.77 ± 2.21			5.27 ± 0.83		
College or university degree	9.48 ± 2.29			5.33 ± 0.83		
Postgraduates	9.29 ± 1.80			6.00 ± 0.00		
Marital status		2.234	0.065		1.167	0.329
Cohabitation	9.80 ± 2.68			5.80 ± 0.45		
Unmarried	9.10 ± 2.30			5.29 ± 0.85		
Marriage	7.40 ± 3.21			5.40 ± 0.89		
Divorcee	6.39 ± 2.38			5.43 ± 0.45		
Careers		1.100	0.352		0.414	0.743
Full-time regular work	9.04 ± 2.53			5.41 ± 0.79		
Part-time work	8.21 ± 2.62			5.25 ± 0.93		
Student	9.08 ± 2.14			5.22 ± 0.92		
Unemployed	9.43 ± 2.24			5.29 ± 0.73		
Average monthly income (yuan)		2.272	0.065		1.123	0.349
<3,000	8.93 ± 2.70			5.29 ± 0.91		
3,001–5,000	8.05 ± 2.46			5.45 ± 0.80		
5,001–8,000	9.90 ± 2.05			5.50 ± 0.69		
>8,000	9.28 ± 2.44			5.06 ± 1.00		
No income	9.08 ± 2.27			5.18 ± 0.87		

Table 7 TGW AIDS-related practices

Practice	Unwilling/ rarely used *n* (%)	General/ Sometimes use *n* (%)	Willing-ness/ Always use *n* (%)
Are you willing to use a condom when having sex? (*n* = 128)	47 (36.72)	12 (9.38)	69 (53.90)
How often do you use condoms when having regular sex? (*n* = 91)	26 (28.57)	23 (25.27)	42 (46.16)
How often do you use condoms when having casual sex? (*n* = 76)	7 (9.21)	14 (18.42)	55 (72.37)

TGW AIDS knowledge acquisition and demand

is part includes three questions: 'What are your ways to obtain AIDS-related knowledge?', 'What publicity activities do you prefer to accept?' and 'What AIDS knowledge points do you think need to be strengthened?'. e survey revealed that 'Internet/smartphone' (81.68%), 'television/radio' (49.62%), 'education on AIDS prevention topics in schools' (48.09%), 'roadside bulletin boards' (44.27%) and 'newspapers/books' (44.27%) were the main approaches for subjects to acquire knowledge about AIDS (Fig. 1). e subjects were more inclined to receive/participate in the following publicity/intervention activities: 'WeChat push' (58.02%), 'peer education' (44.27%) and 'mobile phone app management' (37.40%) (Fig. 2). e knowledge points about AIDS that the subjects thought needed to be disseminated were 'means of transmission' (71.76%), 'knowledge about voluntary counselling and testing' (67.94%), 'knowledge about the virus' (64.89%) and 'the dangers of AIDS' (64.12%) (Fig. 3).

Discussion

e results revealed that the awareness rate of AIDS knowledge of TGW in Chongqing, China, was 82.03%. Compared with other studies, the awareness rate is higher than that of Wang Xiaodan's study on TGW in Kunming [7] but lower than the requirement that the awareness rate of prevention and control knowledge

of the oating population, young students, supervised persons in regulatory places and other key groups and those who are vulnerable to AIDS risk behaviours should exceed 90% (the requirement that the awareness rate of AIDS prevention and control knowledge of residents should exceed 85%) in the 13th Five Year Action Plan for China's Containment and Prevention of AIDS issued by the State Council. ese ndings indicate that the awareness rate of TGW AIDS knowledge in Chongqing should be improved.

Amongst the eight questions concerning AIDS-related knowledge, 'Can a person infected with HIV be seen from the outside?' and 'Can mosquito bites spread AIDS?' e correct response rate for these two questions was less than 70%, which is a blind spot and a misconception for this population. e low level of knowledge on whether HIV is transmitted through mosquito bites is more in line with the ndings of the study by Paula Tiittala et al. [11]. Many studies have shown that the older a person is, the less knowledge about HIV, and they are unaware of HIV prevention [16]. e higher education level group has a greater advantage in terms of knowledge of HIV [17]. In this study, a higher education level and occupation of the subjects as students had higher awareness rates of AIDS konwledge. ese ndings demonstrate that schools signi cantly a ect the education and publicity of related knowledge about HIV. e better economic conditions of

social pressures and discrimination. ese pressures and types of discrimination include but are not limited to con ict over gender identity, social exclusion and economic marginalisation [22], and TGWs themselves are at high risk of HIV infection [23]. Life experiences and personal-level risks in this context may lead them to hold more sympathetic and supportive attitudes toward HIV and its su erers. In addition, several studies have shown that TGW participation in HIV care can be e ectively increased by providing gender-a rming health services and enhancing community support [24, 25].

In terms of HIV-related practices, the knowledge rate of Chongqing TGW in China was 93.75% for 'correct use of condoms can reduce the transmission of HIV', which is a strong awareness of HIV prevention, but the frequency of condom use during regular/temporary sex was 46.16% and 72.37%, respectively. is situation indicates a 'separation of knowledge and action' phenomenon in this population. Transgender MSM have a knowledge–do gap [7], and they face higher levels of substance abuse and multiple partner relationships, which are important pathways for HIV transmission [6]. Moreover, TGWs face barriers to accessing HIV-related healthcare services with lower accessibility, which further exacerbates the knowledge–activity gap [26]. In addition to the increasing knowledge of HIV amongst TWGs revealed in this study, further research is needed to explore the causes of knowledge and behavioural segregation and to develop e ective behavioural interventions for TGWs.

On the basis of the aforementioned ndings, the main approaches for TGWs to gain knowledge about HIV are internet/smartphone, TV/radio and school education on HIV prevention topics, and they are more inclined to receive WeChat pushes, peer education and mobile phone apps to manage intervention activities. Some studies have shown that internet and social media interventions are being conducted and have begun to prevent high-risk sexual behaviour in China [27, 28]. Foreign studies have also con rmed that online social networking apps can be used as interactive platforms for disease prevention interventions and health promotion for people at high risk of HIV because of their convenience, a ordability and timeliness [29]. e use of online methods to disseminate HIV knowledge and prevention services

high-risk sexual behaviors related to AIDS is relatively high. In addition, the high knowledge rate amongst students in the TGW group indicates that the AIDS-related health education and publicity conducted in schools are e ective. Health and health departments and the CDC should focus on TGWs aged 35 years and older who have low income and low literacy. Long-term plans and policies for AIDS prevention and treatment must be formulated, and the goals and strategies of publicity and education for high-risk groups must be clari ed. Furthermore, social organisations and online platforms must be promoted to further strengthen AIDS health education and publicity from the perspective of knowledge access and demand.

Abbreviations

TGWs	Transgender women
MSM	Men who have sex with men
KAP	knowledge–attitude–practice
CDC	Center for Disease Control and Prevention
ANOVA	analysis of variance
SD	Standard deviation
CI	Con□dence interval
PrEP	preexposure prophylaxis

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Author contributions
YT collated and analysed the data and wrote the manuscript. JY collected and supplied the data. YC made the initial entries to collate the data. FC and HZ conceptualised the study and provided overall guidance for the study. JZ collected the data. LO and CZ designed the study and gave guidance. All authors approved the □nal manuscript.

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Data availability
All data from the results of this study are available upon request from the corresponding author.

Declarations

Ethics approval and consent to participate
The study was approved by the Medical Research Ethics Committee of Chongqing Medical University. Informed consent was obtained from all participants before the study began.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interestsd deviation

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