

The impact of social capital on civil society organizations delivering voluntary counseling and testing HIV/AIDS service: a cross-sectional study in China

Liu Liu¹, Danni Wang², Xia Qin³, Zhi Hu^{1,3,*}, Ren Chen^{3,*}

¹ Department of Epidemiology and Biostatistics, School of Public Health, Anhui Medical University, Hefei, Anhui, China;

² Central Laboratory of Preventive Medicine, School of Public Health, Anhui Medical University, Hefei, Anhui, China;

³ School of Health Services Management, Anhui Medical University, Hefei, Anhui, China.

SUMMARY In China, Voluntary HIV Counseling and Testing (VCT) services are mostly provided by Civil Society Organizations (CSOs). This cross-sectional study investigated the association between CSOs' social capital and VCT service availability in eight Chinese provinces during July–December 2015. Data on CSOs' characteristics were collected through questionnaire-based interviews. Social capital was measured using a purpose-developed questionnaire. Logistic regression models tested the association between social capital and the scale of VCT services. A total of 103 CSOs that provided VCT to MSM (MSM-focused CSOs), and 109 CSOs that provided such service to non-MSM population (other CSOs) were included. Overall, 144 (67.9%) CSOs were not registered with local governments, while 106 (50%) received RMB 50,000 (\$7,670) funding in 2014. Multivariate logistic regression analysis indicated that the CSOs with a higher level of shared vision were more likely to provide a large-scale of VCT service than those with a lower level of shared vision (AOR = 1.95). Moreover, intra-networks were positively associated with the VCT service (AOR = 2.87) among other CSOs, while the level of shared vision was positively associated with the VCT service (AOR = 3.08) among other-MSM-focused CSOs. There was no significant association between social capital and total service scale. Our findings suggest that increasing social capital can potentially enhance VCT service and play an important role in AIDS prevention.

Keywords HIV/AIDS, Civil Society Organizations, Social Capital, Voluntary Counseling and Testing service, China

1. Introduction

Voluntary HIV counseling and testing (VCT) are important diagnostic services for early detection and treatment for people living with HIV (PLWH) and for implementing HIV/AIDS prevention and control strategies (1). Over the past decade, VCT services have played an important role in the management of the HIV/AIDS epidemic (2). Since the detection strategy expansion in 2004, the detection rate and number of new diagnoses has been increasing substantially. However, in China, approximately one third of HIV infected people have not yet been diagnosed (3-7). These undiagnosed individuals are not only the main source of infection for the spread of the disease, but owing to the lack of diagnosis, they may miss the appropriate time at which treatment should be administered. Previous studies have focused on individual factors associated with willingness or acceptance rates of HIV interventions (8,

9), while only a few studies have addressed the VCT service utilization from the perspective of social capital, especially social capital of Civil Society Organizations (CSOs). From a public health perspective, this study hopes to provide information on other diseases or subsequent evaluation through a retrospective analysis of data.

Currently, the mode through which AIDS spreads in China is not evident. With the rapid development of Internet technology and wide use of social software, the risk factors of HIV transmission are increasing. The latest report on AIDS epidemic in China showed that 71.1% and 22.7% of the 41,351 new HIV cases occurred through heterosexual and homosexual transmission, respectively, in the third quarter of 2018 (10). These data indicate that the VCT services in China need to target men who have sex with men (MSM), commercial sex workers (CSWs), and other hard-to-reach populations (11). Often these groups are not socially accepted

and VCT services do not reach them. Aware of this problem, the Chinese authorities have launched CSOs that promote HIV/AIDS intervention strategies. Non-governmental, not-for-profit, voluntary entities formed by volunteers work independently from the state and market, representing a separate set of interests and ties. These CSOs are a conglomerate of community-based organizations (CBOs), scientific research institutions or universities, governmental and non-governmental organizations, and grassroots organizations. The number of CSOs specifically dedicated to HIV/AIDS has increased from 0 in 1988 to more than 700 in 2019. CSOs provide all advantages of easy access to high-risk behavior groups and those infected with HIV/AIDS. The currently existing CSOs are involved in nearly all aspects of HIV/AIDS prevention, treatment, and care, attracting attention on research focused on capacity building and effective management (12-14). They also improve their working ability constantly and play an important auxiliary role. Therefore, CSOs are an indispensable force and an important complement to the AIDS prevention and control team. However, few previous studies have examined the organizational social capital, such as VCT service, which may improve the success rate of the HIV/AIDS management strategy.

In recent years, social capital has gained a great amount of attention in public health, although there has been very little consensus on its definition. Understood as "features of social organization, such as networks, norms, and trust, which facilitate coordination and cooperation for mutual benefit" (15), social capital can be an individual or a collective asset stored within relationships among individuals, groups, or organizations. Furthermore, social capital might be an important factor in eradicating HIV/AIDS. Studies have explored and discussed the association between social capital and individual knowledge, attitude, or behavior (16-19). However, few investigations on the effect of social capital of CSOs on HIV/AIDS have been conducted.

In this study, we adopted a perspective of structural, relational, and cognitive on organizational social capital described by Ghoshal as our operational definition (20,21). Questionnaires were designed to measure the intra-organizational social capital, which present members' interactions and relationships within the CSOs. Structural social capital within CSOs refers to social interaction ties; relational social capital includes assets that are rooted in these relationships, such as trust and support, and cognitive social capital is embodied in attributes like a shared code or a shared paradigm that facilitates a common understanding of collective goals. Within the context of this definition, we hypothesized that social capital is positively associated with the VCT service offered by the CSOs.

2. Materials and Methods

2.1. Ethics statement

Ethical approval for the study was obtained from the Biomedical Ethics Committee, Anhui Medical University (Approval No. 20131235).

2.2. Study sites, participants, and procedure

According to the Classification Criteria of AIDS Epidemic Level in China (22), the AIDS epidemic is currently distributed in 12 I Type provinces, 14 II Type province, and 5 III Type provinces, representing 38.71%, 45.16%, and 16.13% of the country, respectively. Based on the epidemic status and geographic distribution of HIV/AIDS, the sample size is allocated according to the ratio. We selected eight provinces: Hunan, Sichuan, and Yunnan (high epidemic areas); Anhui, Hubei, Shandong, and Jilin (medium epidemic areas); Gansu (low epidemic areas). Inclusion criteria for the CSOs were (i) organizations listed as social organizations working on HIV/AIDS, and (ii) they have existed for 1 year or longer. Following the methodology described by Tsai and Ghoshal, we collected data through a questionnaire-based survey. We sampled 1-3 members of each CSO, who were key informants for this CSO. To be eligible for inclusion, these members had to meet the following criteria: (i) occupy director/manager-level post, and (ii) having worked at that organization for 1 year or longer.

Cross-sectional surveys were conducted in the selected provinces between July and December 2015. Respondents were asked to sign consent forms ahead of the interview. Information on the survey was explained to the interviewee before trained investigators from the Anhui Medical University collected survey responses through a face-to-face interview. Data were collected on the basic information, VCT service scale, total service scale, and social capital of the CSO. The collective level of the variable was defined by respondent who is the director of the CSO or the mean value of 2-3 respondents accordingly.

2.3. CSOs' basic information

Based on literature review (12), we collected basic information regarding the participating CSOs, which includes factors that might be related to the VCT service. These factors are shown in Table 1.

2.4. VCT service and total service scale

The VCT services offered by the CSOs were measured according to the following criteria: (i) VCT sites were government-based, for example, established within municipal Centers for Disease Prevention and Control (CDC), and the service users chose to get tested introduced and encouraged by the CSOs, and (ii) the CSOs provided VCT services independently, for

Table 1. Basic characteristics and intra-organizational social capital level among study CSOs *n* (%)

Items	Overall (<i>n</i> = 212)	MSM-focused CSOs (<i>n</i> = 103)	Other CSOs (<i>n</i> = 109)	χ^2	<i>P</i>
Number of core staff				11.30	< 0.001**
< 3	47 (22.2)	14 (13.6)	33 (30.3)		
3-5	113 (53.3)	56 (54.4)	57 (52.3)		
>5	52 (24.5)	33 (32.0)	19 (17.4)		
Funding (Dollar)				1.39	0.50
< 3,068	53 (25.0)	23 (22.3)	30 (27.5)		
3,068-18,408	106 (50.0)	51 (49.5)	55 (50.5)		
> 18,408	53 (25.0)	29 (28.2)	24 (22.0)		
HIV/AIDS service year				7.44	0.02*
< 5	70 (33.0)	26 (25.2)	44 (40.4)		
5-9	98 (46.2)	57 (55.3)	41 (37.6)		
> 9	44 (20.8)	20 (19.4)	24 (22.0)		
Registration				5.50	0.02*
No	136 (64.2)	59 (57.3)	77 (70.6)		
Yes	76 (35.8)	44 (42.7)	32 (29.4)		
AIDS epidemic situation				14.02	< 0.001**
Low	24 (11.3)	8 (7.8)	16 (14.7)		
Middle	84 (39.6)	54 (52.4)	30 (27.5)		
High	104 (49.8)	41 (39.8)	63 (57.8)		
Net-works				1.59	0.21
Low	100 (47.2)	44 (42.7)	56 (51.4)		
High	112 (52.8)	59 (57.3)	53 (48.6)		
Trust				1.09	0.30
Low	87 (41.0)	46 (44.7)	41 (37.6)		
High	125 (59.0)	57 (55.3)	68 (62.4)		
Support				0.22	0.64
Low	92 (43.4)	43 (41.7)	49 (45.0)		
High	120 (56.6)	60 (58.3)	60 (55.0)		
Shared vision				0.53	0.47
Low	96 (45.3)	44 (42.7)	52 (47.7)		
High	116 (54.7)	59 (57.3)	57 (52.3)		

p* < 0.05; *p* < 0.001.

example, setting up a small room to provide counseling and testing with strict adherence to guidelines. The scale of the VCT services provided by CSOs was measured with a question: How many people among your service users have received VCT during the past year? The total service scale was measured with a question: How many people from the target population did your organization provide HIV/AIDS service to in the past year?

2.5. Key elements of social capital

Based on classic research on organizational social capital within firms (21) and our previous research (23-25), we considered four dimensions of social capital in this study: networks, trust, support, and shared vision. The networks dimension assessed the members' interaction within the organization. The trust dimension referred to members' trust and trustworthiness in the organization. The support dimension represented how well the members could help each other. Shared vision captured the common understanding of collective goals and proper ways of acting within the organization. Key members were asked to describe the level to which they agreed with the description of each item on a 5-point response scale. The social capital questionnaire is reported in an appendix.

2.6. Data analysis

The continuous variables constituting CSO basic information, including the number of core staff, amount of funding, and duration of HIV/AIDS service were transformed into ordinal variables, using the upper and lower quartiles as cutoff points. Quantitative data about the VCT service and number of service users were collected from the key informants. To evaluate the association between VCT service characteristics and social capital, the level of VCT service and number of service users were converted into binary variables. The median was used as the cutoff point to define a high level of VCT service (≥ 200) vs. low level of VCT service (< 200), as well as high number of service users (≥ 600) vs. low number of service users (< 600).

Cronbach's α values were calculated to estimate the reliability of the social capital scale. The social capital of CSOs was measured by a component score of each dimension, using factor analysis. It was grouped into a binary variable and the mean component score was used as the cutoff point between high social capital (component score ≥ 0) vs. low social capital (component score < 0) (24).

All data were manually entered into Epidata 3.0 software, crosschecked, and verified by trained

staff. Separate analyses were performed on MSM-focused CSOs and other CSOs. A descriptive analysis was performed, and the results were expressed as frequencies and percentages; differences between groups were tested with the χ^2 test and Fisher's exact test. Multivariate logistic regression models were used to calculate odds ratios (ORs) and corresponding 95% confidence intervals (CIs), which measured the association between VCT service scale (high level of VCT service vs. low level of VCT service) and total service scale (high number of service users vs. low number of service users), adjusted for the following potential confounders: core staff size, funding, HIV/AIDS service year, registration state, and district status of the HIV/AIDS epidemic. IBM SPSS Statistics 23.0 was used for all statistical analyses (SPSS Inc., Chicago, IL).

3. Results

3.1. Descriptive statistics

A convenience sample of 327 individuals (key informants) from 212 organizations was selected for this study, including 61 individuals from 28 organizations in Sichuan, 103 individuals from 63 organizations in Yunnan, 39 individuals from 30 organizations in Anhui, 22 individuals from 13 organizations in Hubei, 21 individuals from 16 organizations in Shandong, 34 individuals from 25 organizations in Jilin, and 34 individuals from 24 organizations in Gansu. According to the National HIV/syphilis/HCV sentinel surveillance report in 2018 (26), sexual transmission accounted for 95% of the annual newly reported infections, and sexual contact between men and men was the main mode of transmission. According to the different service objects of CSOs, is divided into two orientations: included MSM and excluded MSM. The total of 212 CSOs included 103 (48.6%) MSM-focused and 109 (51.4%) other organizations (Table 1). The median received funding was RMB 50,000 (equivalent to \$7,670) (interquartile range RMB20,000-120,000 [equivalent to \$3,068-18,408]). Nearly half of the included CSOs had two or fewer core staff. Overall, 44 (20.8%) CSOs had participated in HIV/AIDS prevention and control for more than 9 years. Additionally, 144 (67.9%) CSOs

were unregistered and 104 (49.8%) CSOs were based in districts classified as high HIV/AIDS epidemic. There were significant differences in core staff size, HIV/AIDS service year, registration state, and districts' HIV/AIDS epidemic level between MSM-focused CSOs and non-MSM-focused CSOs. However, the differences between MSM-focused CSOs and non-MSM-focused CSOs in scores on each dimension of social capital were not statistically significant (Table 1).

Participants at the director level of the organization were asked to report the number of total service users and objects who adopted VCT services in their organization during last year. The total service scale and VCT service scale differed between MSM-focused CSOs and other CSOs (Table 2).

3.2. Factor analysis and social capital characteristics

Four factors were extracted with eigenvalues above 1.0. After running a varimax orthogonal rotation, the four factors explained 73.1% of the total variance. The overall Cronbach's α coefficient for social capital was 0.98, with dimension-specific coefficients of 0.91 (networks), 0.89 (trust), 0.86 (support), and 0.68 (shared vision).

3.3. Correlates of organizational social capital and total service scale

As shown in Table 3, CSOs participated in HIV/AIDS prevention and intervention over 9 years than below 5 years (AOR = 5.09), registered CSOs (AOR = 2.25) were likely to provide service to larger target population than not registered CSOs. Compared to CSOs located in low-epidemic areas, CSOs based in middle- and high-epidemic areas were more likely to provide services to a smaller target population (AOR = 0.23/0.30). Among the MSM-focused CSOs, the organizations in receipt of funding between RMB 20,000 (\$3,068) and RMB 120,000 (\$18,408), which also had participated in HIV/AIDS prevention and control for 9 years or more, were more likely to provide service to a larger target population (AOR = 4.53 and AOR = 6.68, respectively) compared to organizations in receipt of funding < RMB 20,000 (\$3,068) that had participated in the HIV/AIDS prevention and control < 5 years. Among other

Table 2. Distribution of service scale among MSM-focused CSOs and non-MSM-focused CSOs n (%)

Items	Overall (n = 212)	MSM-focused CSOs (n = 103)	Other CSOs (n = 109)	χ^2	P
Number of service people				4.76	0.03 [*]
< 600	111 (52.4)	46 (44.7)	65 (59.6)		
≥ 600	101 (47.6)	57 (55.3)	44 (40.4)		
Number of VCT people				6.68	< 0.001 ^{**}
< 200	116 (54.7)	47 (45.6)	69 (63.3)		
≥ 200	96 (45.3)	56 (54.4)	40 (36.7)		

^{*}p < 0.05; ^{**}p < 0.001.

Table 3. Multivariate logistic regression analysis of organizational social capital associated with total service scale (total service people < 600 vs. total service people ≥ 600)

Items	Adjusted OR (95 % CI)		
	Overall CSOs	MSM-focused CSOs	Other CSOs
Number of core staff			
< 3	1.00	1.00	1.00
3-5	1.99 (0.82-4.82)	0.96 (0.21-4.34)	3.56 (1.06-11.98)*
> 5	2.75 (0.97-7.76)	0.75 (0.15-3.70)	8.60 (1.70-43.66)*
Funding (Dollar)			
< 3,068	1.00	1.00	1.00
3,068-18,408	1.63 (0.72-3.73)	4.53 (1.25-16.38)*	0.54 (0.16-1.87)
> 18,408	1.38 (0.50-3.84)	3.07 (0.61-15.41)	0.41 (0.08-2.04)
HIV/AIDS service year			
< 5	1.00	1.00	1.00
5-9	1.70 (0.81-3.57)	2.58 (0.78-8.54)	1.12 (0.38-3.25)
> 9	5.09 (1.97-13.17)*	6.68 (1.32-33.97)*	4.29 (1.16-15.89)*
Registration			
No	1.00	1.00	1.00
Yes	2.25 (1.23-4.50)*	1.57 (0.57-4.35)	2.56 (0.89-7.34)
AIDS epidemic situation			
Low	1.00	1.00	1.00
Middle	0.23 (0.07-0.71)*	0.11 (0.01-1.16)	0.19 (0.04-0.88)*
High	0.30 (0.10-0.94)*	0.13 (0.01-1.21)	0.70 (0.15-3.23)
Net-works			
Low	1.00	1.00	1.00
High	1.62 (0.85-3.06)	1.07 (0.41-2.81)	2.01 (0.75-5.38)
Trust			
Low	1.00	1.00	1.00
High	1.17 (0.62-2.01)	1.29 (0.51-3.28)	1.25 (0.45-3.48)
Support			
Low	1.00	1.00	1.00
High	1.88 (0.98-3.59)	2.37 (0.84-6.69)	1.54 (0.56-4.19)
Shared vision			
Low	1.00	1.00	1.00
High	0.81 (0.43-1.53)	0.46 (0.16-1.31)	0.88 (0.33-2.33)
Service object			
MSM-focused CSOs	1.00		
Other CSOs	1.91 (0.99-3.68)		

* $p < 0.05$.

CSOs, organizations with more core staff and longer service tenure were more likely to serve a larger target population (AOR = 3.56, AOR = 8.60, and AOR = 4.29). Concurrently, CSOs located in the middle- and low-level epidemic areas were more likely to provide services to a smaller target population (AOR = 0.19). The multivariate logistic regression analysis did not reveal any association between the social capital level and the total service scale.

3.4. Correlates of organizational social capital and VCT service scale

The number of core staff (3-5 core staff, AOR = 3.65; > 5 core staff, AOR = 5.59) was correlated with a larger VCT service scale among all participating CSOs (Table 4). More importantly, the level of shared vision was positively associated with the number of VCT service users (AOR = 1.95). Among the MSM-focused CSOs, the level of networks was positively associated with the number of VCT service users (AOR = 2.87). Among

other CSOs, the number of core staff (3-5 core staff, AOR = 6.34; > 5 core staff, AOR = 12.77), and the HIV/AIDS epidemic level in the district (high epidemic district, AOR = 8.50) were correlated with a larger scale of the VCT service. Finally, high support level component of social capital was positively associated with the number of VCT service users (AOR = 3.08).

4. Discussion

4.1. CSOs working on HIV/AIDS in China

Over the past 20 years, CSOs in China have significantly increased their involvement in the AIDS response (12). Consistent with previous studies, our analyses have shown that CSOs working on HIV/AIDS had played a valuable role in all aspects of HIV/AIDS-related prevention and control efforts (27,28). In our study, 103 (48.6%) CSOs focused on MSM, hard-to-reach populations such as IDUs, and CSWs still took a small proportion, which reflected the political and

Table 4. Multivariate logistic regression analysis of organizational social capital associated with VCT service scale (VCT service people < 200 vs. VCT service people ≥ 200)

	Adjusted OR (95 % CI)		
	Overall CSOs	MSM-focused CSOs	Other CSOs
Number of core staff			
< 3	1.00	1.00	1.00
3-5	3.65 (1.43-9.35)*	1.96 (0.43-8.91)	6.34 (1.57-26.32)*
> 5	5.59 (1.88-16.64)*	3.01 (0.59-15.29)	12.77 (2.14-76.38)*
Funding (Dollar)			
< 3,068	1.00	1.00	1.00
3,068-18,408	1.71 (0.75-3.90)	1.03 (0.32-3.37)	3.18 (0.75-13.61)
> 18,408	1.95 (0.71-5.33)	1.28 (0.27-6.00)	1.93 (0.37-10.13)
HIV/AIDS service year			
< 5	1.00	1.00	1.00
5-9	1.21 (0.57-2.56)	2.13 (0.65-6.96)	0.53 (0.15-1.91)
> 9	1.98 (0.79-4.97)	4.31 (0.91-20.35)	1.66 (0.44-6.34)
Registration			
No	1.00	1.00	1.00
Yes	1.41 (0.71-2.77)	0.69 (0.05-9.54)	0.34 (0.04-2.79)
AIDS epidemic situation			
Low	1.00	1.00	1.00
Middle	1.38 (0.44-4.36)	0.38 (0.06-2.61)	3.11 (0.44-21.78)
High	2.27 (0.71-7.28)	0.77 (0.12-5.19)	8.50 (1.12-64.60)*
Net-works			
Low	1.00	1.00	1.00
High	1.67 (0.89-3.14)	2.87 (1.08-7.63)*	0.81 (0.29-2.27)
Trust			
Low	1.00	1.00	1.00
High	1.03 (0.54-1.93)	1.73 (0.69-4.35)	0.68 (0.23-1.99)
Support			
Low	1.00	1.00	1.00
High	1.09 (0.58-2.06)	1.38 (0.51-3.78)	1.27 (0.45-3.63)
Shared vision			
Low	1.00	1.00	1.00
High	1.95 (1.02-3.72)*	1.57 (0.58-4.22)	3.08 (1.03-9.21)*
Service object			
MSM-focused CSOs	1.00		
Other CSOs	1.79 (0.93-3.44)		

**p* < 0.05.

cultural context of CSOs in China (14,29). Moreover, 67.9% of the CSOs included in the present study were unregistered, higher than in previous studies, which reported that 55-65% of China's CSOs working on HIV/AIDS were unregistered (12,30). It is widely acknowledged that the legal status of a CSO is paramount to its performance (31,32). For example, unregistered CSOs are typically unable to manage their own finances and bank accounts, making it difficult for them to mobilize large-scale resources (33). In the last few years, registration restrictions on CSOs have been loosened in China (14). However, without reforms to the registration process, most CSOs continue to face difficulties as professional organizations, which prevent them from expanding the services they provide (12).

According to previous studies, CSOs working on HIV/AIDS usually receive financial support from three sources: *i*) government investment, *ii*) international programs, and *iii*) corporate and individual donations. An examination into Chinese CSOs working on HIV/AIDS has revealed that these organizations typically

have annual budgets of \$US 7,000 (34). However, in our study, we found that a majority of the included organizations lacked funding. In 2014, the median amount of funding available to these organizations was RMB 50,000 (\$US 7,670), while 22.6% of the included CSOs had not received any grants in the preceding year. Kaufman noted that despite large amounts donated to AIDS in China, little funding reaches the local NGOs (28). In June, 2014, the Global Fund to fight AIDS had reached its financial goal for operations in China, and a "Fund for Social Organizations Participating in HIV/AIDS Prevention and Control" was initiated by the Chinese government in June 2015 (35). These efforts notwithstanding, as Minghui *et al.* commented, China must make a parallel commitment to supporting at-risk groups and the civil society organizations that represent them (36).

4.2. VCT service offered by the CSOs

The VCT service is a delivery point for prevention and

treatment of AIDS/HIV. The Chinese government had launched the VCT service through local health agencies in major cities in 2003 (37). By 2012, 9016 VCT service sites had been established, and over 2,300,000 people received voluntary counseling and testing (38). Despite these developments, the rate of VCT access among MSM, IDUs, CSWs, and other high-risk populations remained low.

Our study indicated that over 104,000 individuals received a VCT service provided by one of the 212 CSOs, suggesting that more attention should be paid to service feasibility. The leader of China's National Centre for AIDS/STD Control and Prevention (NCAIDS/STD) stated that stigma and discrimination were significant obstacles to HIV VCT (39). However, CSOs have advantages to effectively offer and expand the VCT service even to under-served populations. For example, Chen (37) reported on VCT outreach among IDUs, in which potential service users were recruited by peer workers with a history of injection drug use, and knowledge of relevant behaviors and locations to effectively recognize and approach members of the target population. As commented by Van de Perre (40), the challenge is no longer to show the efficacy of the VCT service but to make it accessible to people who need it and to render it acceptable, accessible, and affordable.

4.3. Social capital and its measurement

In our study, careful attention was given to the design and validation of the social capital measurement questionnaire. As noted above, the analytical units of social capital can be on the level of an individual, organization, or society. Nevertheless, the research available on social capital specifically in the context of CSOs' is rare. We obtained better internal reliability values for the collective-social capital questionnaire used in our survey (0.68-0.91) than the values obtained by previous studies conducted in mainland China (41).

4.4. Social capital and VCT service

Our study is the first to explore the potential association between the VCT service and collective-social capital of CSOs dedicated to HIV/AIDS management in China. The results indicated that social capital, in particular, shared vision, was significantly associated with the level of VCT among all CSOs, while networks and shared vision were significantly associated with VCT service scale among MSM-focused CSOs and other CSOs, respectively. The multivariate logistic regression analysis did not reveal any association between social capital level and total service scale. These findings indicate that VCT service scale, rather than total service scale, can be used as a performance indicator for CSOs working on HIV/AIDS management. Capacity building

and policy-making efforts should be separate and specific for MSM-focused and other CSOs.

In this study, networks could facilitate the VCT activities among MSM-focused CSOs. As Tsai and Ghoshal noted, frequent and close social interactions permit actors to know one another, share important information, and create a common point of view (21). This suggests that meetings and discussions between core and general members of CSOs staff could identify goals and strategies relevant to the organizations. They could also help implement suitable activities, including health and peer education, professional training, and communication and behavioral interventions more efficiently. Moreover, active interactions within organizations could help recruit new members and spread to them knowledge of HIV through conversations and discussions. In fact, a previous study conducted in China revealed that influence of acquaintances and peers is associated with the willingness to attend a VCT (42). Concurrently, other studies have suggested that knowledge about AIDS and perceptions of HIV/AIDS-associated risks also impact on VCT utilization (16, 43-45).

Previous research has defined cognitive social capital as a common understanding between social actors through shared language and narratives (15,21). It is embodied in attributes such as shared vision or shared values that facilitate individual and collective action. As cognitive social capital increases, the more likely a common perception and interpretation of events is to develop (46). When a shared vision was present within a CSO, the organization was dynamic and cohesive. The staff and members were more likely to unite and fulfill the collective aim and duty. Moreover, shared values indicate how the group should do things and enable individuals to be more committed to interpersonal relationships (47). Together, these factors contribute to the utilization of VCT.

As for the high-risk populations, examples from China and other Asian countries have shown that criminalization and stigma remain as obstacles to rights protection and disease prevention(14,48,49). As such, the goal for the CSOs should be to identify, understand, and reach the most vulnerable groups.

It was not surprised to find that CSOs focused on high-risk populations use a set of symbols and codes in line with the service population in daily communication, actually, many core members just came from the service population (29). When people within organizations use commonly-known symbols and codes, they might gain credibility and acceptance from service users, which, in turn, might help reduce fears of AIDS, making a higher level of VCT use achievable (50).

In the present study, the CSO registration status was positively associated with the level of VCT service. In China, official registration for CSOs takes place with the Ministry of Civil Affairs (MOCA) and criteria

for registration are high (12). At the same time, only the registered CSOs are legally recognized, leaving unregistered CSOs struggling with personnel recruitment and participation in open-bidding for domestic or international AIDS programs, which might be obstacles to reaching service users.

No association was found between trust or support and the level of VCT. Some scholars have proposed that trust measures only capture psychological aspects that might be relevant but are not necessarily indicative of social capital (51). This framework might account for some of our findings. Another possible factor is that trust and support were mainly rooted in organizations, while in consideration of VCT modality already defined above, VCT service could be offered by CDC and other governmental institutions, thus despite the high level of trust and support obtained from CSOs, the service objects still hesitated to have counseling and testing for HIV because of stigma and discrimination (52). Further research is needed to elucidate the association between support, trust, and the level of the VCT service. Additionally, a shift from the present clinic-based approach to a more routine and widespread public health model should be established (53), and Chinese CSOs have the capacity to fill this need (37). The current structure and number of AIDS prevention and control professionals are not sufficient to provide intervention to all vulnerable AIDS groups, and cannot meet the needs associated with the rapid increase in prevention and control tasks every year. After standardized training and daily guidance, CSOs involved in the prevention and control work will implement the advantages of a flexible working mode, will find it easier to work with the target population, and will be competent in the prevention and control work. CSOs in the field of AIDS prevention and treatment can compensate for the lack of professionals, provide more convenient testing and consulting services, and the communication between companions makes it easier to achieve the humanistic care needs of the infected people. Such communication can help relieve mention trauma and burdens.

Chinese governments at all levels coordinate and promote cooperation between CSOs, the Chinese Center for Disease Control and Prevention in the field of AIDS prevention and control (54). With the coordinated effort, they can gradually establish an information disclosure mechanism for CSOs, improve credit management systems, and ensure healthy and orderly development of CSOs participating in the prevention and control of AIDS. CSOs should clearly indicate the work orientation and development direction in AIDS prevention and control, and strengthen the organizational construction of rules and regulations, personnel team, working conditions, supervision and management, social reputation, the working advantages, working capacity, work performance and cooperation

level, in AIDS prevention and control. They should also focus on stimulating their own vitality and actively participate in AIDS prevention and control activities. The Chinese Center for Disease Control and Prevention should establish a work information communication mechanism with CSOs, coordinate and solve the technical difficulties and problems related to CSO work, strengthen the training of professional skills and management ability regarding prevention and control, and assist CSOs in purchasing prevention and control services offered by the government.

There are some limitations associated with our study. First, the CSOs included in the present survey were a convenient sample, which might not represent all Chinese CSOs. Second, because of the nature of a cross-sectional study design, the reported relationship is an association, and no conclusions can be drawn regarding causality. Third, because social capital, as defined in this study, was measured at a collective level, the individual- and social-level impact of social capital were not considered. Fourth, due to the limitation in data source and data integrity, some important indicators are still lacking. The rate of VCT use, social discrimination, stigma, and other important factors are all significant variables of CSOs. These variables will be assessed in future studies. Regardless, our study provides a base upon which future surveys examining the impact of CSOs' social capital on the use of VCT service in the Chinese context can be built and applied to low and middle-income countries.

In conclusion, our study provides an initial exploration of correlations between aspects of social capital and the level of VCT service promoted by CSOs dedicated to HIV/AIDS management in China. To our knowledge, this is the first China-based study to investigate such associations. With further research, our findings can be used to develop evidence-based policy to improve the level of VCT service.

Acknowledgements

The authors thank the participations and all who were involved in the surveys. Specially thanks to Hunan, Sichuan, Yunnan, Anhui, Hubei, Shandong, Jilin and Gansu CDC and local civil society organizations for assisting the field work. This study was funded by grants 71303007 and 71874002 from the National Natural Science Foundation of China (Dr Chen), and the Faculty Doctoral Fellowship of Anhui Medical University (Grant No. XJ201702, Dr wang).

References

1. Schwartz CE, Zhang J, Stucky BD, Michael W, Rapkin BD. Is the link between socioeconomic status and resilience mediated by reserve-building activities: mediation analysis of web-based cross-sectional data

- from chronic medical illness patient panels. *BMJ open*. 2019; 9:e025602.
2. Hong NT, Wolfe MI, Dat TT, McFarland DA, Kamb ML, Thang NT, Thai HN, Del Rio C. Utilization of HIV voluntary counseling and testing in Vietnam: an evaluation of 5 years of routine program data for national response. *AIDS Educ Prev*. 2011; 23:30-48.
 3. Zhang T, Tian X, Ma F, Yang Y, Yu F, Zhao Y, Gao M, Ding Y, Jiang Q, He N. Community based promotion on VCT acceptance among rural migrants in Shanghai, China. *PLoS One*. 2013; 8:e60106.
 4. Tucker JD, Wong FY, Nehl EJ, Zhang F. HIV testing and care systems focused on sexually transmitted HIV in China. *Sex Transm Infect*. 2012; 88:116-119.
 5. Zhang TP, Liu C, Han L, Tang W, Mao J, Wong T, Zhang Y, Tang S, Yang B, Wei C, Tucker JD. Community engagement in sexual health and uptake of HIV testing and syphilis testing among MSM in China: a cross-sectional online survey. *J Int AIDS Soc*. 2017; 20:21372.
 6. Wu ZY. HIV/AIDS prevention strategy with Chinese characteristics. *Chinese Journal of Disease Control & Prevention*. 2019; 23:885-889. (in Chinese)
 7. Wu ZY. Achievement of HIV/AIDS program in the past 30 years and challenges in China. *Chin J Epidemiol*. 2015; 36:1329-1331. (in Chinese)
 8. Denison JA, O'eilly KR, Schmid GP, Kennedy CE, Sweat MD. HIV voluntary counseling and testing and behavioral risk reduction in developing countries: a meta-analysis, 1990--2005. *Aids Behav*. 2008; 12:363-373.
 9. Musheke M, Ntalasha H, Gari S, McKenzie O, Bond V, Martin-Hilber A, Merten S. A systematic review of qualitative findings on factors enabling and deterring uptake of HIV testing in Sub-Saharan Africa. *BMC Public Health*. 2013; 13:220.
 10. National Center for AIDS/STD Control and Prevention, Chinese Center for Disease Control and Prevention. Update on the AIDS/STD epidemic in China and main response in control and prevention in the third quarter of 2015. *Chinese Journal of AIDS & STD*. 2015; 21:915. (in Chinese)
 11. Zhang Q, Fu YS, Liu XM, Ding ZQ, Li MQ, Fan YG. HIV Prevalence and Factors Influencing the Uptake of Voluntary HIV Counseling and Testing among Older Clients of Female Sex Workers in Liuzhou and Fuyang Cities, China, 2016-2017: A Cross-Sectional Study. *Biomed Res Int*. 2020;9634328.
 12. Li H, Kuo NT, Liu H, Korhonen C, Pond E, Guo H, Smith L, Xue H, Sun J. From spectators to implementers: civil society organizations involved in AIDS programmes in China. *Int J Epidemiol*. 2010; 39:ii65-71.
 13. Xu H, Zeng Y, Anderson AF. Chinese NGOs in action against HIV/AIDS. *Cell Res*. 2005; 15:914-918.
 14. Kaufman J. HIV, sex work, and civil society in China. *J Infect Dis*. 2011; 204:S1218-1222.
 15. Sun X, Rehnberg C, Meng Q. How are individual-level social capital and poverty associated with health equity? A study from two Chinese cities. *Int J Equity Health*. 2009; 8:2.
 16. Frumence G, Eriksson M, Nystrom L, Killewo J, Emmelin M. Exploring the role of cognitive and structural forms of social capital in HIV/AIDS trends in the Kagera region of Tanzania - a grounded theory study. *Afr J AIDS Res*. 2011; 10:1-13.
 17. Cené CW, Akers AY, Lloyd SW, Albritton T, Powell Hammond W, Corbie-Smith G. Understanding social capital and HIV risk in rural African American communities. *J Gen Intern Med*. 2011; 26:737-744.
 18. Campbell C, Scott K, Nhamo M, Nyamukapa C, Madanhire C, Skovdal M, Sherr L, Gregson S. Social capital and HIV competent communities: the role of community groups in managing HIV/AIDS in rural Zimbabwe. *AIDS care*. 2013; 25:S114-S122.
 19. Sivaram S, Zelaya C, Srikrishnan AK, Latkin C, Go VF, Solomon S, Celentano D. Associations between social capital and HIV stigma in Chennai, India: considerations for prevention intervention design. *AIDS Educ Prev*. 2009; 21:233-250.
 20. Helliwell JF, Putnam RD. The social context of well-being. *Philos Trans R Soc Lond B Biol Sci*. 2004; 359:1435-1446.
 21. Murayama H, Fujiwara Y, Kawachi I. Social capital and health: a review of prospective multilevel studies. *J Epidemiol*. 2012; 22:179-187.
 22. Chinese Center for Disease Control and Prevention. Classification Criteria of AIDS Epidemic Level in China. http://www.chinacdc.cn/jkzt/crb/zl/azb/jszl_2219/201306/t20130617_81691.html (accessed June 1, 2013). (in Chinese)
 23. Hu F, Niu L, Chen R, Ma Y, Qin X, Hu Z. The association between social capital and quality of life among type 2 diabetes patients in Anhui province, China: a cross-sectional study. *BMC Public Health*. 2015; 15:786.
 24. Ma Y, Qin X, Chen R, Li N, Chen R, Hu Z. Impact of individual-level social capital on quality of life among AIDS patients in China. *PLoS One*. 2012; 7:e48888.
 25. Wang D, Mei G, Xu X, Zhao R, Ma Y, Chen R, Qin X, Hu Z. Chinese non-governmental organizations involved in HIV/AIDS prevention and control: Intra-organizational social capital as a new analytical perspective. *Biosci Trends*. 2016; 10:418-423.
 26. National Center for AIDS/STD Control and Prevention China CDC. National HIV/syphilis/HCV sentinel surveillance report in 2018. Beijing: 2019. (in Chinese)
 27. Chen X. Situation analyses for civil society involving in HIV/AIDS prevention and control in China. *Chinese J AIDS& STD*. 2006; 12:580-582. (in Chinese)
 28. Wang D, Xu X, Mei G, Ma Y, Chen R, Qin X, Hu Z. The Relationship Between Core Members' Social Capital and Perceived and Externally Evaluated Prestige and Cooperation Among HIV/AIDS-Related Civil Society Organizations in China. *Eval Health Prof*. 2017; 40:61-78.
 29. Hussien SA, Jones M, Moore S, Hood J, Smith JC, Camacho-Gonzalez A, Del Rio C, Harper GW. Brothers Building Brothers by Breaking Barriers: development of a resilience-building social capital intervention for young black gay and bisexual men living with HIV. *AIDS care*. 2018; 30:51-58.
 30. Hui L, Mei L, Jinfeng L. Situation analysis for NGOs and civil societies involved in HIV/AIDS prevention and control programs in some provinces of China. *Chinese J AIDS& STD*. 2008; 14:246-248. (in Chinese)
 31. Smith J, Mallouris C, Lee K, Alfvén T. The Role of Civil Society Organizations in Monitoring the Global AIDS Response. *AIDS Behav*. 2017; 21:44-50.
 32. Lau JTF, Wang Z, Kim Y, Li J, Gu J, Mo PKH, Wang X. Low sustainability, poor governance, and other challenges encountered by grassroots non-governmental organizations targeting HIV prevention for men who have

- sex with men in China - a nation-wide study. *AIDS care*. 2017; 29:1480-1490.
33. Niu C. A Survey of Grassroots NGOs involved in China's HIV/AIDS Prevention and Control. *The Chinese Journal of Human Sexuality*. 2005; 14:8-17. (in Chinese)
 34. Rong G, Ke L, Jing L, Mengjie H. An analysis of involvement of China's social organizations in HIV/AIDS prevention and control. *Chinese J AIDS& STD*. 2011; 17:506-508, 518. (in Chinese)
 35. Chinese Center for Disease Control and Prevention. Notifications on Establishing Fund of Social Organizaitons Participate in HIV/AIDS Prevention and Control Commission NHaFP, ed. <http://www.moh.gov.cn/jkj/s3585/201507/f6a7e1b9918c4416a9a4aeda0eaa4091.shtml> (accessed Dec 25, 2015).
 36. Minghui R, Scano F, Sozi C, Schwartlander B. The Global Fund in China: success beyond the numbers. *Lancet Glob Health*. 2015; 3:e75-77.
 37. Chen HT, Liang S, Liao Q, Wang S, Schumacher JE, Creger TN, Wilson CM, Dong B, Vermund SH. HIV voluntary counseling and testing among injection drug users in south China: a study of a non-government organization based program. *AIDS Behav*. 2007; 11:778-788.
 38. Chenxi L, Jiefang L, Shujun L, Ning W. Current Research Situation of HIV Voluntary Counseling and Testing in China. *Chinese J AIDS& STD* 2014; 20:624-627. (in Chinese)
 39. WU Z, Sun X, Sullivan S, Detels R. HIV Testing in China. *Science*. 2006; 312:1475-1476.
 40. Van de Perre P. HIV voluntary counselling and testing in community health services. *Lancet*. 2000; 356:86-87.
 41. Jianglin K, Jintao S, Jianmin S. Dimensions' developing and structure's testing of team social capital. *Studies in Science of Science*. 2007; 25:935-940. (in Chinese)
 42. Wang Y, Li B, Pan J, Sengupta S, Emrick CB, Cohen MS, Henderson GE. Factors associated with utilization of a free HIV VCT clinic by female sex workers in Jinan City, Northern China. *AIDS Behav*. 2011; 15:702-710.
 43. Gage AJ, Ali D. Factors associated with self-reported HIV testing among men in Uganda. *AIDS care*. 2005; 17:153-165.
 44. Feleke SA, Koye DN, Demssie AF, Mengesha ZB. Reproductive health service utilization and associated factors among adolescents (15-19 years old) in Gondar town, Northwest Ethiopia. *BMC Health Serv Res*. 2013; 13:294.
 45. Tsegay G, Edris M, Meseret S. Assessment of voluntary counseling and testing service utilization and associated factors among Debre Markos University Students, North West Ethiopia: a cross-sectional survey in 2011. *BMC Public Health*. 2013; 13:243.
 46. Grover E, Grosso A, Ketende S, Kennedy C, Fonner V, Adams D, Sithole B, Mnisi Z, Maziya SL, Baral S. Social cohesion, social participation and HIV testing among men who have sex with men in Swaziland. *AIDS care*. 2016; 28:795-804.
 47. Knight L, Hosegood V, Timaeus IM. Obligation to family during times of transition: care, support and the response to HIV and AIDS in rural South Africa. *AIDS care*. 2016; 28:18-29.
 48. Nall A, Chenneville T, Rodriguez LM, O'Brien JL. Factors Affecting HIV Testing among Youth in Kenya. *Int J Environ Res Public Health*. 2019; 16: E1450.
 49. Watson J, Tang W, Pan S, Wu D, Zhao P, Cao B, Liu C, Bien C, Huang W, Luo Z, Tucker JD. Out of the closet, into the clinic: opportunities for expanding men who have sex with men-competent Services in China. *Sex Transm Dis*. 2018; 45:527-533.
 50. Muriisa RK, Jamil I. Addressing HIV/AIDS challenges in Uganda: does social capital generation by NGOs matter? *SAHARA J*. 2011; 8:2-12.
 51. Carpiano RM, Fitterer LM. Questions of trust in health research on social capital: what aspects of personal network social capital do they measure? *Soc Sci Med*. 2014; 116:225-234.
 52. Fu R, Kutner BA, Wu Y, Xie L, Meng S, Hou J, Gu Y, Xu H, Zheng H, He N, Meyers K. Do gay and bisexual men who conceal their same-sex behavior prefer different kinds of health services? Findings across four cities to inform client-centered HIV prevention in China. *BMC Public Health* 2020; 20:4.
 53. Ikechebelu IJ, Udigwe GO, Ikechebelu N, Imoh LC. The knowledge, attitude and practice of voluntary counselling and testing (VCT) for HIV/AIDS among undergraduates in a polytechnic in southeast, Nigeria. *Niger J Med*. 2006; 15:245-249.
 54. Lo CY. Securitizing HIV/AIDS: a game changer in state-societal relations in China? *Global Health*. 2018; 14:50.
- Received March 28, 2020; Revised April 24, 2020; Accepted May 11, 2020.
- *Address correspondence to:*
Zhi Hu, Ren Chen, School of Health Services Management, Anhui Medical University. No. 81, Meishan Road, Hefei 230032, Anhui, China.
E-mail: aywghz@126.com (ZH), chenren2006@hotmail.com (RC)
- Released online in J-STAGE as advance publication May 16, 2020.