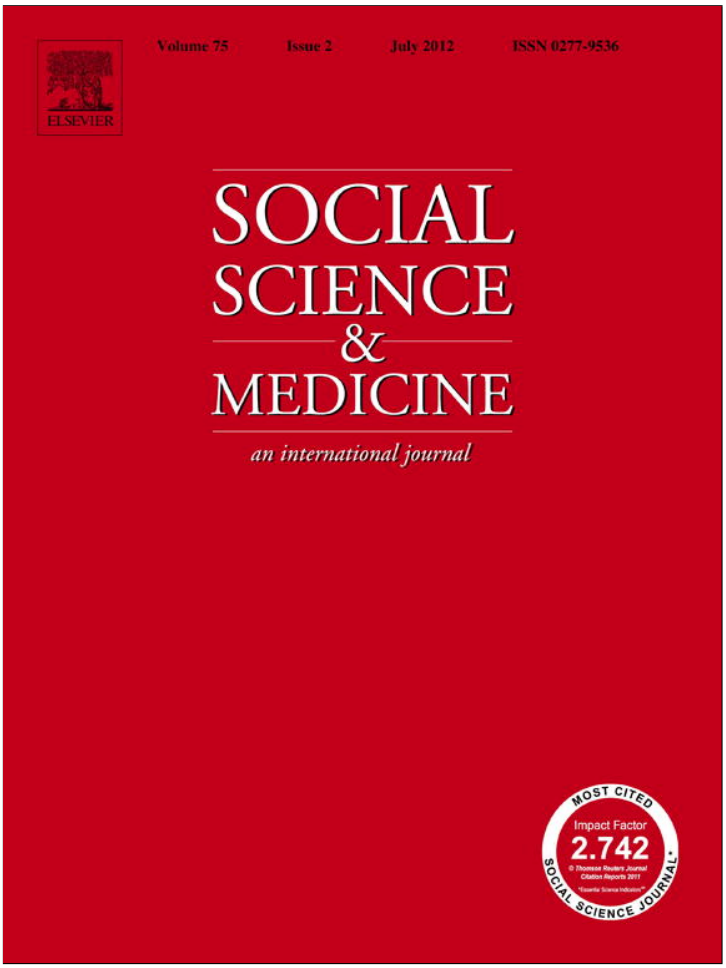

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Short report

Regional differences in HIV prevalence and individual attitudes among service providers in China

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ABSTRACT

We examined the relationships between a region's HIV prevalence and HIV-related knowledge, perceived risk of HIV infection, perceived institutional support for HIV care, and avoidance attitude toward persons living with HIV (PLH) among service providers in China. Data were collected from 40 county-level hospitals in two provinces, including 1760 service providers. Multi-sample standardization and decomposition analysis was performed for HIV knowledge, perceived risk, institutional support, and avoidance attitude toward PLH. After adjusting for potential confounders, service providers from the province with higher HIV prevalence perceived a higher risk of contracting HIV at work, recognized more institutional support for HIV care, and reported a lower level of avoidance attitude toward PLH compared to those from the province with lower HIV prevalence. After confounding factors were standardized across provinces, occupational exposure experience was determined to be the strongest influence on the discrepancy of avoidance attitudes in the two provinces. Regional contextual factors could shape individual providers' attitudes and beliefs and impact the quality of care. Stigma reduction interventions need to be culturally tailored and region-specific.

Introduction

Since HIV was first detected in 1985, China has recorded about 326,000 cases of HIV infection, of which 107,000 developed into AIDS (Ministry of Health China, 2010). All 31 provinces of China have reported HIV infections, yet the geographical distribution of cases is highly disproportional. Recent estimates show that the five highest-prevalence provinces account for 53.4% of the total national cases, whereas the five provinces with the lowest prevalence account for less than 1% of total infections (UNAIDS, 2009). Despite this highly varied distribution, few studies have considered regional context as a linkage to individual attitudes and behaviors associated with the HIV epidemic in China.

HIV-related stigma appears to be universal across regions, but increased recognition is being given to the importance of context (Ogden & Nyblade, 2005; Parker & Aggelton, 2003). Although two regions may have a similar prevalence of HIV, the meaning of the epidemic can vary by region (Diaz & Toro-Alfonso, 2007). Conversely, the degree of HIV-related stigma can be tied to prevalence of infection (e.g., with significant stigmatization occurring in areas where few communities are affected, and minimal stigmatization occurring in areas with high-prevalence) (Busza, 1999; Genberg et al., 2009; MacIntosh, 2007). Furthermore, the social, economic, political, and historical characteristics of a region may all contribute to manifestations of a broadly universal phenomenon like stigma (Castro & Farmer, 2005; Ogden & Nyblade, 2005). Hence, the regional context is paramount in understanding how HIV stigma develops and plays out (Mahajan et al., 2008). Understanding the regional differences in HIV stigma attitudes can shed new light on planning the future course of stigma reduction intervention programs (Pope & Shoultz, 2010).

Our main objective in this study was to investigate the relationships between a region's HIV prevalence and HIV-related stigma among service providers. Specifically, we compared stigma and related factors, including HIV knowledge, perceived infection risk at work, perceived institutional support for self-protection, and avoidance attitude toward persons living with HIV (PLH) between service providers in primary medical care settings in two provinces of China. This study provides an

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opportunity to capitalize on regional considerations when developing conceptual frameworks of stigma and discrimination reduction in medical care across various settings.

Methods

Study sites and sampling

This study was conducted in 2009 in two provinces of China. One province had one of the highest infection rates while the other province reported one of the lowest HIV prevalence rates. The province with the higher HIV prevalence is defined as Province A and the province with the lower HIV prevalence is defined as Province B. By the end of 2007, Province A had recorded 57,325 cases of HIV infection, among which 7630 had progressed to AIDS (Jia et al., 2010). During the early stage of the epidemic, needle sharing was the primary transmission route in Province A. However, the proportion of infection caused by needle sharing decreased drastically from 100% in 1989 to 42.5% in 2007, with sexual transmission accounting for 47.4% of total infections in 2007 (Jia et al., 2010). In contrast, the reported number of HIV/AIDS cases in Province B is low (State Council AIDS Working Committee Office, UN Theme Group on AIDS in China, 2007). By the end of 2007, Province B cumulatively reported 1387 HIV cases, among which 629 had developed into AIDS. HIV/AIDS cases in Province B were spread mainly through unprotected sexual acts, with heterosexual transmission accounting for 67.3% of the reported HIV cases in 2009 (Southeast Express, 2009).

This study employed a two-stage sampling strategy. The first stage involved random sampling of 40 county-level hospitals in the two provinces. County-level hospitals were chosen due to their status as the most advanced local hospitals within easy access for most residents (Brown & Theoharides, 2009; Davis & Chapman, 2002). In the second sampling stage, service providers were randomly selected from each hospital using a publicly available hospital staff roster. We intentionally selected potential providers who provide direct services to patients, including doctors, nurses, and lab technicians. Forty-four service providers were randomly selected from each county hospital. The recruiter approached a total of 1896 potential participants and 1760 participated in the study (refusal rate $< 5\%$).

Procedures

Research staff approached randomly selected providers with a standardized recruitment script. Project researchers explained the purpose of the study, procedures, potential risks and benefits, and obtained written informed consent from the participants before collecting data. All study documents and procedures were approved by the Institutional Review Board (IRB) of the University of California at Los Angeles and the Chinese Center for Disease Control and Prevention. Each participant was paid 50 yuan (U.S. $7.50) for their participation.

Each participating provider completed a self-administrated questionnaire that took approximately 35 min to complete. A trained interviewer was present to answer questions during the assessment. The questionnaire covered demographics, medical education and training, HIV knowledge, perceived risk of contracting HIV at work, assessment of institutional support for HIV care, and attitudes toward PLH.

Measures

Service providers' avoidance attitude toward PLH was measured using a scale of eight items, which was modified from Herek's study (1999) and our previous work in China (Li et al., 2007). Participants were asked about their willingness to provide service to PLH in eight hypothetical situations. Sample questions in the scale included, "If HIV positive patients visit the hospital, would you be willing to provide all service needed?" and "If your supervisor asked you to do a physical examination of a known HIV-positive patient, would you be willing to do so?" Items were scored from 1 (strongly agree) to 5 (strongly disagree). Some items were reversed so that a higher score indicates a higher level of avoidance attitude regarding providing service to PLH (range: 5–40; $\alpha = 0.84$).

To measure the extent to which the participant personally perceived institutional support from the hospital authority, a 14-item scale was developed based on a similar scale used with service providers in China (Li, Liang, Wu, Lin, & Wu, 2008). Participants were asked about the availability and the support related to infection protection and HIV care in their hospitals, including universal precaution supplies (e.g., gloves, sterile needles, disinfectant, and disposal containers), post-exposure prophylaxis materials and procedures (e.g., antiretroviral therapy drugs, concurrent disinfection, medical insurance, and psychological counseling for occupational exposure); and the accessibility of HIV information and training. This measure was calculated by summing the positive (yes) responses with a higher number, indicating better perceived institutional support in the hospital (range: 0–14; $\alpha = 0.80$).

Perceived infection risk at work was constructed by combining five questions that measured the providers' perceived probability of contracting HIV at different scenarios at work. Sample scenarios included: "If you provide physical examination to PLH, how likely is it that you would become infected with HIV?"; and "If you provide surgery to PLH, how likely is it that you would become infected with HIV?" Responses ranged from 0 (not possible) to 3 (high possibility). In this scale, a higher number was associated with higher perceived risk of HIV infection at work (range: 0–15; $\alpha = 0.73$).

HIV knowledge was measured using 12 questions that covered the topics of HIV transmission route, prevention, and treatment methods. These questions have been used together or separately in many studies to measure HIV knowledge. For each question, the response was coded as 1 (correct answer) or 0 (incorrect answer or don't know). The scale was constructed as a sum of the 12 items (range: 0–12).

We also collected the respondents' demographic information such as gender, age, medical training, and professional category (doctor, nurse, or lab technician), previous contact with PLH at work, and occupational exposure to a patient's secretions.

Statistical analysis

Demographic characteristics were compared across the two provinces using chi-square analysis for categorical measures. We first described the distribution of age, gender, medical education, profession, contact with PLH at work, and experience of occupational exposure in the two provinces. This step of the statistical analysis was performed in SAS version 9.2 (SAS Institute Inc., Cary, NC).

The provincial-specific crude scores of HIV-related scales, including HIV knowledge, perceived HIV risk at work, perceived institutional support, and avoidance attitude at work, were calculated and compared across provinces using two sample t-test. The crude means ignore the possibility of confounding factors (such as age, gender, education, profession, contact of HIV/AIDS patient at work, and experience of occupational exposure) that influence the means across provinces.

Standardization and decomposition analysis (Wang, 2003; Wang, Rahman, Siegal, & Fisher, 2000) was performed to standardize

the means of HIV-related scales across provinces based on demographic makeup, and to estimate what the means would be if there was not a statistically significant difference in demographic characteristics across provinces. This step of the analysis was performed using DECOMP V.2.0 (Wang, Carlson, Falck, Leukefeld, & Booth, 2007). We also incorporated Das Guptas' (1993) non-parametric method, which does not make assumptions on the distribution or relationship between variables (e.g., normality or linearity). Scores of HIV knowledge, perceived HIV risk at work, perceived institutional support, and avoidance attitude were adjusted by six compositional variables, including gender, age group (18–30, 31–40, 41–50, 51 and above), medical training (undergraduate and above), profession (nurses, doctors, and lab technicians), contact with PLH, and experience of occupational exposure. Standard errors of the component effects were estimated on the basis of 1000 bootstrap resamples, which is sufficient to estimate the standard errors of the mean differences (Wang, 2003). The adjusted values of outcome variables in the two provinces, their difference and significance levels, and the factor component effects (e.g., differences attributed to compositions of certain confounding factors) were reported.

Results

A total of 1760 service providers were recruited for this study at a female-to-male ratio of 67%–33%. The background characteristics of the study sample in the two provinces are summarized in Table 1.There were more male participants in the Province B sample (38.07% vs. 26.93%, $P < 0.0001$). The age range was 20–68 with a mean of 36 ± 8.3. The participants from Province B tended to be younger than those from Province A. At the time of the survey, 42% of the participants had received four years of medical education or higher. More participants from Province B had an undergraduate or above medical degree than participants from Province A (46.30% vs. 36.61%, $P < 0.0001$). About 49% of the participants were doctors and 43% were nurses. The Province B sample included slightly more doctors than the Province A sample (50.11% vs. 48.30%, $P = 0.0382$). Significantly more service providers in Province A had previously treated HIV-positive patients at work than providers in Province B (76.02% vs. 38.11%, $P < 0.0001$). No significant difference was found in experience of occupational exposure.

Table 1
Comparison of demographic characteristics between providers in the two provinces.

	Province A		Province B		*P*
	N	%	*N*	%	
Gender					
Male	237	26.93	335	38.07	<0.0001
Female	643	73.07	545	61.93	
Age					
18–30	176	20.00	335	38.11	<0.0001
31–40	450	51.14	298	33.90	
41–50	198	22.50	198	22.53	
51 or older	56	6.36	48	5.46	
Medical training					
Vocational high school or below	163	18.65	223	25.37	<0.0001
Associate medical degree	391	44.74	249	28.33	
Undergraduate degree or above	320	36.61	407	46.30	
Profession					
Doctor	425	48.30	441	50.11	0.0382
Nurse	397	45.11	357	40.57	
Lab technician and other	58	6.59	82	9.32	
Contact PLH at work					
Yes	669	76.02	335	38.11	<0.0001
No	211	23.98	544	61.89	
Had occupational exposure					
Yes	746	84.77	771	87.61	0.0841
No	134	15.23	109	12.39	

In the crude analysis (Table 2), participants from Province A demonstrated a higher level of HIV knowledge (9.90 vs. 9.63), perceived higher risk of contracting HIV at work (8.73 vs. 8.13), and recognized more institutional support (13.24 vs. 12.45) than participants from Province B. In contrast, Province A participants reported a significantly lower level of avoidance attitude to serve PLH compared with the Province B participants (17.85 vs. 19.30). All these differences in the crude analysis were highly significant ($P < 0.0001$).

After taking four background factors (age, gender, medical training, and profession), as well as contact with PLH and occupational exposure into account, the difference in HIV knowledge was no longer significant (9.64 vs. 9.46, $P = 0.1036$). Province A still showed a significantly higher perceived risk and institutional support after the aforementioned potential confounders were controlled. The adjusted values and the significant level of the differences are shown in Table 2.

Table 3 represents each potential confounding factor that contributed to the differences in the observed outcome measures in the two provinces (the numbers given in the last two rows of Table 3 are the mean differences between Province A and Province B). The percent distribution of effects column shows the direction and extent to which each component effect contributes to the observed outcome difference between the two compared samples. A positive percentage indicates that the component effect would enlarge the observed outcome difference, and a negative percentage shows that the component effect would contribute to the observed outcome in an opposite direction (Wang et al., 2007). Previous contact with PLH contributed the most to an enlarged effect in the difference in HIV knowledge (58.94%). That is to say, controlling for other factors, the differences in previous contact with PLH contributed to 58.94% of the differences in HIV knowledge between the two provinces. Experience of caring for HIV patients (15.64%) and occupational exposure experience (15.45%) both augmented the difference in perceived risk of contracting HIV at work. Contacting PLH also contributed to the difference between scores of perceived institutional support in the two samples. Other than the intrinsic differences, previous occupational exposure (13.38%) was the strongest compelling factor for the discrepancy of avoidance attitude between the two provinces.

Discussion

Recently, there has been substantial research on HIV-related stigma in health care settings (Fergusson et al., 2010; Li et al., 2007, 2008; Yiu, Mak, Ho, & Chui, 2010). Past research on HIV stigma has provided descriptive information about individual providers' perceptions, attitudes, and behaviors toward PLH, but little work has been done on comparisons across epidemiologic or cultural context (Chan & Reidpath, 2005; Reidpath, Brijnath, & Chan, 2005; Smith & Mbakwem, 2010). The current study includes two provinces with varied HIV prevalence and infection routes in diverse regions, thus allowing us to disentangle the relationship among HIV-related stigma, fear of infection, and HIV prevalence.

Our study revealed that the different epidemiologic contexts in the two provinces, combined with the varying composition of demographic characteristics, education/training, and previous experience with HIV/AIDS, is associated with the level of avoidance attitude toward PLH among service providers. After adjusting for potential confounders, service providers in the low epidemic area, who had a similar level of HIV knowledge as those in the high epidemic area, reported a significantly higher level of avoidance

Table 2
Comparison of HIV-related scales between service providers in the two provinces.

	Crude analysis					Adjusted value[a]		
	Province A		Province B		*P*	Province A	Province B	*P*
	Mean	SD	Mean	SD		Mean	Mean	
HIV knowledge	9.896	1.325	9.627	1.530	<0.0001	9.640	9.462	0.1036
Perceived risk	8.731	2.59	8.131	2.457	<0.0001	8.567	8.008	0.0002
Institutional support	13.236	2.764	12.453	2.936	<0.0001	12.824	12.298	0.0054
Avoidance attitude	17.845	4.189	19.297	4.072	<0.0001	17.673	18.855	<0.0001

[a] Adjust for gender, age group (18–30, 31–40, 41–50, 51 and above), medical training (undergraduate and above), profession (nurse vs. others), having contacted PLH at work, and having experience of occupational exposure.

attitude to PLH at work. This finding was supported by a study that compared the HIV-related stigma in four countries and found more negative attitudes in sites with the lowest HIV prevalence (Genberg et al., 2009). Busza (1999) also reported normalization of discrimination and avoidance attitude in high-prevalence areas. High-prevalence of HIV may allow service providers to have more personal experience with PLH, which in turn leads to lower levels of stigmatizing attitudes and behaviors. On the other hand, in a region with low HIV prevalence, providers' fear about HIV could be more anticipated than realistic. It is important to note that in some previous studies, perceived risk of infection at work was found to be positively associated with negative attitudes toward PLH (Jemmott, Freleicher, & Jemmott, 1992; Li et al., 2007). One possible explanation is that perceived risk of infection at work may affect HIV-related stigma at the individual level, but HIV prevalence may affect stigma at community and societal levels. Further work on the relationships between the HIV epidemic and HIV-related stigma and discrimination is needed to tease out the multiple layers and abstruse interrelationships.

The experience of caring for PLH without adequate resources and institutional support contributes to stigmatizing attitudes and behaviors toward PLH (Li et al., 2008). In this study, the difference in perceived institutional support in the two regions must be understood in the context of geography: where HIV prevalence is relatively low, less attention is given to the disease and fewer resources are available for providers who have to care for PLH. Service providers are concerned that if they are exposed to contaminated blood fluid, there will be insufficient post-exposure prophylaxis medications available (Lin, Li, Wu, Wu, & Jia, 2008). In contrast, in settings with an exceedingly "critical" HIV epidemic that retains greater access to preventive measures (e.g., sterile rubber gloves, HIV-related training, and health insurance coverage), service providers feel more protected and attribute less blame to their patients. This finding is consistent with other studies that established health and socioeconomic resources help shield PLH from discrimination (Maman et al., 2009). In addition, institutional support and HIV-related education and trainings may lead to a higher level of knowledge regarding HIV, as discovered in this study, which may relate to reduced levels of HIV-related stigma. Therefore the data presented here imply how resources have an indirect link to HIV-related stigma. Policies that allocate resources and funding to certain regions and provide institutional support for HIV care can potentially play an important role in HIV stigma reduction.

This study has several limitations. First, the cross-sectional design limits the ability to make causal inferences. Second, service providers in this study may have underreported negative attitudes toward PLH due to social desirability. Third, other than different HIV epidemic profiles, there might be other factors affecting a person's stigmatized behavior and attitude, including social, cultural, geographical, and historical characteristics. Lastly, we acknowledge that the magnitudes of difference identified for the outcome variables appear to be small, and the statistically significance reported could be due to the large sample size of the study. Although the magnitudes of the difference are relatively small, findings in predicting differences provide useful evidence to the expected direction.

Our findings have implications for future research and intervention design. First, regional contextual factors such as disease prevalence and transmission mode could shape individual providers' attitudes and beliefs and impact the quality of care for PLH. HIV stigma and discrimination assessments need to be culturally tailored and consider the region-specific HIV epidemic (Weiss, Ramakrishna, & Somma, 2006). Also, regional disparity must be considered in stigma reduction interventions. Service providers in low-prevalence areas have a more pressing need to dispel prejudice and avoidance toward PLH. Casual and close contact with PLH could help to normalize the issue of HIV/AIDS, suggesting a good mechanism for facilitating stigma reduction interventions.

Table 3
Results of multi-sample standardization and decomposition analysis on HIV knowledge, perceived risk, institutional support and avoidance attitude at work (adjust for six variables).

	HIV knowledge		Perceived risk		Institutional support		Avoidance attitude	
	Difference (SE)	% Distribution of effects	Difference (SE)	% Distribution of effects	Difference (SE)	% Distribution of effects	Difference (SE)	% Distribution of effects
Gender	0.003 (0.023)	1.010	0.030 (0.024)	5.105	0.061 (0.037)	7.571	0.002 (0.049)	−0.125
Age group	0.058 (0.044)	20.847	0.017 (0.048)	2.789	0.114 (0.058)	14.100	0.043 (0.086)	−2.960
Medical training	−0.021 (0.027)	−7.430	0.007 (0.026)	1.150	0.068 (0.041)	8.490	−0.075 (0.052)	5.209
Being a nurse	−0.038 (0.027)	−13.850	−0.022 (0.029)	−3.736	−0.026 (0.042)	−3.190	−0.060 (0.055)	4.192
Contact PLH	0.163 (0.056)	58.935	0.093 (0.067)	15.638	0.131 (0.084)	16.247	0.028 (0.117)	−1.971
Occup. exposure	−0.066 (0.038)	−23.733	−0.091 (0.045)	−15.452	−0.069 (0.047)	−8.514	−0.192 (0.078)	13.378
Crude difference (A − B)	0.277 (0.066)§	100.02	0.592 (0.117)§	99.996	0.805 (0.135)§	100.000	−0.144 (0.204)§	100.004
Adjusted difference (A − B)	0.178 (0.109)	64.237	0.559 (0.151)‡	94.501	0.526 (0.189)†	62.285	−0.182 (0.026)§	82.280

Note. Significance level: *<0.05; †0.01; ‡0.001; §0.0001.

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