

DIFFUSION OF POSITIVE AIDS CARE MESSAGES AMONG SERVICE PROVIDERS IN CHINA

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There is great potential in adapting the popular opinion leader (POL) intervention model to address HIV-related stigma and quality of care among service providers in China. Using a representative sample of 1,101 service providers in China, this study provides preliminary descriptions of POL provider characteristics. Multiple regression analyses revealed that diffusion of positive AIDS care messages among service providers in China was associated with factors such as gender, ethnicity, medical education, level of care, personal contact with people living with HIV/AIDS, and HIV-related training. Those who were more knowledgeable about HIV and those with a lower level of discriminatory attitude at work were more likely to diffuse the positive messages to co-workers and friends. Reported characteristics of a potential provider opinion leader in China will inform the design and implementation of future intervention programs.

China's first AIDS case was identified in 1995. Since then the number of reported annual HIV infections in China has increased steadily, reaching an estimated 650,000 infections by the end of 2005 (China Center for Disease Control and Prevention, 2004; China Ministry of Health, 2006; Wu, Rou, & Cui, 2004; Wu, Sullivan, Wang, Rotheram-Borus, & Detels, 2007). The rapid spread of HIV infection has become a major challenge for health service providers in China, with the demand for HIV testing, counseling, diagnosis, and treatment increasing. The recent implementation of the Four Frees and One Care national policy reflects this heightened demand, as it mandates free ARV treatment for people living with AIDS, free prevention treatment for mother-to-child transmission, and free testing. In addition, Four Frees and One Care encourages service providers to take more responsibility in combating the expansion of HIV infection. However, studies have shown that many service providers in China are hesitant to provide services to people living with HIV/AIDS (PLWHA), as they lack enough basic knowledge about the disease, are concerned about their own safety, and tend to stereotype some already socially marginalized groups, such as injection drug users, men who have sex with men, and sex workers (Buskin, Li, Yin, Yu,

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This article was completed with the support of National Institute of Mental Health Grant R01MH070931. The authors thank Alan Semaan, Sonia Johnson, and Lynwood Lord for their editorial assistance.

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& McGough, 2002; Feng, 2002; Li, Cole, Zhang, & Chen, 1993; Li, Wu, Zhao, Lin, Detels, & Wu, in press; Wu, Qi, Zeng, & Detels, 1999). Consequently, the control of the HIV/AIDS epidemic in China has been significantly hindered.

Previous studies have demonstrated that an HIV/AIDS stigma reduction intervention for service providers could increase knowledge and awareness of the disease and change attitudes by reducing fear of HIV transmission through everyday contact and increasing level of comfort, confidence, motivation, and willingness to provide care to PLWHA (Buskin et al., 2002; Lalonde et al., 2002; Rutstein et al., 1998; Sowell, Seals, Wilson, & Robinson, 1998). These studies also highlighted the high importance of training service providers in working with HIV/AIDS and of incorporating HIV/AIDS intervention activities into their routine activities (Buskin et al., 2002; Wu et al., 2002).

HIV intervention and prevention programs have been shaped through the successful adaptation of the popular opinion leader (POL) model, which was developed using the diffusion of innovation theory (Rogers, 1983). Diffusion theory posits that behavioral change is achieved when information and ideas, such as new risk-reducing methods in the case of HIV prevention, is disseminated by opinion leaders through their personal and social networks (Sivaram et al., 2004). Kelly and colleagues have shown that systematically identified, recruited, and trained POLs make a positive impact on sexual behavior change in populations of men attending gay bars in the United States (Kelly et al., 1991; Kelly et al., 1992; Kelly et al., 1997). In the POL model, ethnographic techniques are employed to systematically identify popular and socially influential members of the target population. The intervention team then recruits and trains these POLs to communicate risk reduction messages to peers during everyday conversations. The POLs, working closely with the intervention team, receive support for sustaining their disease prevention advocacy activities (Kelly, 2004).

In China there is great potential in adapting the POL model to address stigma reduction among service providers. Service providers in China are a relatively stable population and have their own social networks, which can increase the efficiency of intervention implementation. Identifying and working with individual POLs within this network is vital for the success of an intervention program. This study describes characteristics of potential POLs among health care providers and investigates factors associated with the diffusion of AIDS care messages by these providers. This information can contribute to the design and implementation of future POL stigma reduction interventions among service providers in China and in other contexts.

METHOD

Sample

This study was conducted in Yunnan Province, which accounts for 40% of all reported HIV cases, the highest infection rate of any province in China (State Council AIDS Working Committee Office and U.N. Theme Group on HIV/AIDS in China, 2004; U.S. Embassy, 2000). The study population consisted of health care providers who were currently working at general public health care facilities. Public health care facilities in China are stratified into five different levels: provincial, city/prefecture, county hospitals, township, and village clinics. Generally, health care facilities at regional levels (provincial or city) serve a broader region and are more likely to have technologically advanced equipment and a more highly educated staff than facilities at local levels (county, township, or village).

The sample was recruited from 89 randomly selected health care facilities from all five levels within three geographic regions. The distribution of sites was as follows: three provincial hospitals, four city/prefecture hospitals, 10 county hospitals, 18 township health clinics, and 54 village clinics. To obtain a broad-based sample, staffing information was gathered from each facility before sampling. We matched the sample ratio of doctors to nurses to the existing ratio in each facility. Hospital laboratory technicians were oversampled to allow for adequate representation in the analysis.

The total sample of 1,101 randomly selected service providers participated in a self-administered survey between January and August 2005, with less than an 8% refusal rate. Individual informed consent was obtained in writing prior to participation in the survey, and all survey data were collected anonymously. A gift of \$10 was given to study participants for their participation. Study protocol, survey instruments, and informed consent forms were reviewed and approved by the institutional review boards (IRBs) of the University of California, Los Angeles and China Centers for Disease Control and Prevention.

MEASURES

The survey questionnaire contained 172 questions assessing participants' demographics, medical training, experience, and attitudes and behavior toward AIDS patients and PLWHA in general.

Diffusion of positive messages, the dependent variable, was constructed to assess the level of communication related to HIV/AIDS care with co-workers or friends among service providers in the past six months. This variable was measured by a four-item scale that asked how often the participant engaged in the following activities in the past 6 months: (a) discussed with co-workers or friends how to protect themselves from HIV infection by following standard procedures of universal precaution, (b) discussed with co-workers or friends how PLWHA deserve the same quality of health care services as everybody else, (c) discussed with co-workers or friends that PLWHA should not be discriminated against in receiving health care services, and (d) discussed with co-workers or friends about protecting the confidentiality of PLWHA. Responses ranged from 0 (never) to 3 (frequently). These four items construct a continuous variable in which higher scores indicate higher levels of communicating positive AIDS care messages among peers. Cronbach's alpha for the variable was .81, which was a satisfactory inter-item reliability.

Discriminatory attitude at work was constructed by combining four items. The scale scored from 1 (strongly disagree) to 5 (strongly agree). Higher scores reflect a higher likelihood to discriminate against HIV-positive patients at work. Cronbach's alpha for the variable was .83, indicating acceptable inter-item reliability for this four-item scale. The item statements were (a) You would be willing to work with HIV-positive patients; (b) If you worked with HIV-positive patients, you would provide the same quality of care to them that you provide to other patients; (c) If the superior in your hospital asked you to do a physical examination of a known HIV-positive patient, you would be willing to do so; and (d) If you worked with HIV-positive patients, you would interact with them just like other patients.

Providers' knowledge of HIV/AIDS was measured using a 10-item scale that included such questions as "Can HIV be transmitted through breast-feeding?" and "Is an HIV vaccine already available?" These questions have been used together or separately in many HIV studies to measure HIV-related knowledge. Responses were

TABLE 1. Descriptions of Diffusing Positive AIDS Care Messages with Co-Workers or Friends in the Past 6 Months

Discussion Topics	Never	Little	Sometime	Frequently
1. Protecting self from HIV infection by following standard procedures of universal precaution	6.36	23.52	51.95	18.17
2. PLWHA deserve the same quality health care services as like everybody else	8.72	27.16	51.04	13.04
3. PLWHA should not be discriminated against in receiving health care services	8.54	27.88	50.77	12.81
4. Protecting the confidentiality of PLWHA	12.53	25.34	48.05	14.08

Note. PLWHA = people living with HIV/AIDS.

coded as 1 (correct answer) or 0 (incorrect answer or unknown). The scale for knowledge of HIV/AIDS was constructed as a sum of all 10 questions.

We also surveyed service providers' demographic information such as age, gender, ethnicity (Han or minority), medical education (lower than associate medical degree, associated medical degree, or medical degree/higher), level of care (provincial/city, county or township/village), professional category (doctor, nurse, or laboratory technician), personal contact with PLWHA (yes or no), and HIV-related training status (yes or no).

ANALYSIS

All analyses were performed using SAS statistical software (SAS Institute, Cary, NC). First, we described the study sample and patterns of diffusing positive messages in the population. Pearson correlation coefficients were then conducted to investigate relationships between diffusion of positive message, discrimination at work, and HIV/AIDS knowledge. Multiple regression analyses were also conducted to examine the associations among diffusion of positive messages, discrimination at work, HIV/AIDS knowledge, and HIV-related training while controlling for the simultaneous effects of participant age, gender, ethnicity, medical education, personal contact with PLWHA, and the level of care. Regression coefficient estimation and their significant levels are reported.

RESULTS

The demographics of our participants were comparable to the 2003 data reported by the National Bureau of Statistics (2004). The study sample ($N = 1,101$) was primarily female (74.4%) and of Han ethnicity (72.7%). Approximately 25.7% of respondents were younger than 30 years old and 28.8% were 41 or older. More than 40% were from provincial or city hospitals, and 50.6% were doctors, 39.9% were nurses, and nearly 9.5% were lab technicians. At the time of the survey, only about 28.5% of the participants had received 4 years or more of medical education. Among all participants, 45.1% reported knowingly having personal contact with an HIV-positive individual and 68.1% had received HIV-related training.

Descriptive analyses of diffusing positive AIDS care messages are presented (Table 1). When asked about the frequency of discussing the four topic areas with co-workers or friends, participants responded similarly on each topic. Approximately half of the sample reported that they had discussed these topics at some point in the past 6 months. Among the four areas, it appears that self-protection from HIV infec-

TABLE 2. Diffusion of Positive AIDS Care Message by Provider Characteristics (N = 1101)

Provider Characteristics	n	Mean	SD	F Value
Age				2.06
29 or younger	280	1.698	0.589	
30-35	312	1.645	0.667	
36-40	183	1.723	0.660	
41 or older	314	1.772	1.772	
Gender				13.64***
Male	282	1.581	0.680	
Female	818	1.746	0.637	
Ethnicity				10.37**
Han	795	1.666	0.635	
Minority	299	1.808	0.688	
Medical education				16.86***
Lower than associate degree	444	1.791	0.639	
Associate degree	342	1.751	0.644	
Medical degree or higher	312	1.526	0.651	
Level of care				14.68***
Provincial or city hospital	450	1.589	0.638	
County hospital	401	1.829	0.631	
Township or village clinic	250	1.715	0.679	
Profession				7.00**
Doctor	557	1.634	0.669	
Nurse	439	1.766	0.624	
Lab technician	105	1.824	0.650	
Personal contact with HIV+ patients				1.08
Yes	497	1.727	0.637	
No	604	1.686	0.666	
HIV-related training				43.91***
Yes	738	1.799	0.635	
No	346	1.523	0.651	

Note. Correlation coefficients: discriminatory attitude at work (-0.18***), HIV knowledge (0.07*). * $p < .05$. ** $p < .01$. *** $p < .001$.

tion was the topic most likely to be discussed among participants, whereas protecting the confidentiality of PLWHA was the least likely to be discussed.

Table 2 presents relationships between diffusion of positive messages and providers' characteristics. Female providers were significantly more likely to diffuse positive messages to co-workers or friends compared with their male counterparts ($F = 13.64$, $p < 0.001$). Significant differences were also found with ethnic background ($F = 10.37$, $p < .01$), medical education ($F = 16.86$, $p < .001$), level of care ($F = 14.68$, $p < .001$), profession ($F = 7.00$, $p < .01$), and HIV-related training ($F = 43.91$, $p < .001$). Correlation coefficients between diffusion of positive messages and discriminatory attitude at work and HIV knowledge are also reported (see Table 2). The level of diffusion of positive messages to co-workers and friends reported by service providers was negatively correlated with their discriminatory attitude at work ($r = -.18$, $p < .001$) and positively related to HIV knowledge ($r = .07$, $p < .005$).

The results of multiple regression analyses are summarized (Table 3). Multiple regression of diffusion of positive messages shows that female respondents were more willing to diffuse positive message than their male counterparts ($\beta = -.16$). The Han ethnicity service providers ($\beta = -.12$) or those who worked at regional (provincial or city) hospitals ($\beta = -.20$) were less likely to discuss positive messages with others compared with those with minority ethnic background or those who worked at local (county, township, or village) medical facilities. Service providers' HIV training, HIV

TABLE 3. Factors Associated With Diffusion of Positive AIDS Care Messages
(*N* = 1,101), Results From Linear Regression

	β	<i>t</i> Value
Age	0.00	0.85
Male	-0.16	-3.19**
Han ethnicity	-0.12	-2.78**
Lower than associate medical education	-0.08	-1.88
Regional hospitals (vs. local)	-0.20	-4.50***
Doctor (vs. others)	-0.07	-1.52
Personal contact with PLWHA	0.11	2.62**
HIV-related training	0.23	5.56***
Discriminatory attitude at work	-0.17	-4.65***
HIV knowledge	0.34	2.34*
<i>R</i> ²		0.12

Note. PLWHA = people living with HIV/AIDS. **p* < 0.05. ***p* < 0.01. ****p* < 0.001.

knowledge, and personal contact with PLWHA were also significant in predicting diffusion of positive messages to co-workers or friends regarding AIDS care for PLWHA. Service providers who had received HIV-related training were more likely to discuss HIV issues with their peers than those who had not ($\beta = .23$), and those who were more knowledgeable about HIV tended to diffuse positive messages to co-workers and friends ($\beta = .34$). Providers who had personal contact with PLWHA were more likely to report a higher level of diffusion of positive messages than those who reported no contact with PLWHA. Not surprisingly, providers with a high level of discriminatory attitude at work were less likely to discuss positive messages with their peers ($\beta = -.17$).

DISCUSSION

Diffusion of innovation theory posits that trends are often initiated and innovations are often diffused by a relatively small segment of POLs in the population (Rogers, 1983). Identifying these POLs in a target population is a vital step for the success of a POL intervention program. This study revealed that diffusion of positive messages among service providers in China was associated with gender, ethnicity, medical education, level of care, personal contact with PLWHA, and HIV-related training. Reported characteristics of a potential provider opinion leader in China will inform the design and implementation of future intervention programs that target stigma reduction among service providers.

The results of this study also showed that more HIV education and training was significantly related to more frequent diffusion of positive HIV messages among providers. This finding is consistent with previous studies that showed that HIV/AIDS training programs among service providers can positively affect changes in patient care and knowledge level of patients, families, and other health care providers (Lalonde et al., 2002). The use of trainers (i.e., formerly trained personnel) to disseminate information about HIV/AIDS and to change attitudes and behaviors is a relatively less expensive and more efficient approach, compared with trainings provided by professionals from other fields or other health care facilities (Wu et al., 2002; Wu et al., 2007).

Another important observation is that service providers working at local (i.e., county, township, or village level) health care facilities were more likely to diffuse positive messages to their personal or social network than those working at higher level

facilities (i.e., provincial or city level). Because service providers at provincial or city hospitals have generally received a higher level of medical education and are exposed to more HIV/AIDS training, they should, theoretically, be more active in HIV/AIDS information diffusion. This was not the case in our findings. There are two possible explanations. First, service providers at regional medical facilities have heavier workloads than those at the local level. Providers working at county and provincial level hospitals serve 8.4 patients and 6.8 patients per day, respectively, but service providers working at county level hospitals serve 4.4 patients per day (China Ministry of Health, 2006). The heavy workload might become an obstacle to quality communication on a regular basis for providers working at city and provincial hospitals. Second, the rural and urban social environment in China probably has played a key role. A sociologist in China has referred to the interpersonal relationship in rural China as simple, close, and affectionate compared with the complex, distant, and practical interpersonal relationship in urban China (Wang, 2001). Service providers working in the same village clinic have likely been friends since childhood, with their homes within walking distance; for them, extended communication is a part of daily life. In contrast, in a provincial or city hospital, providers working in the same department may come from different provinces with very different experiences, and their discussions are likely to be limited to the day-to-day work routine. This implies that developing training programs targeting different levels of facilities is probably a more effective strategy in China for future HIV/AIDS intervention and prevention.

Although the findings of this study are significant, there are some limitations. First, data were collected from an area with the highest report of HIV/AIDS cases in China. Service providers in this area may behave differently than those in other parts of the country, limiting the generalizability of our results. Furthermore, the study relied exclusively on self-report data, which brings up issues surrounding recall accuracy. Notwithstanding these limitations, our findings seem clear enough to encourage further study of providers and their role as key players in the development of a POL intervention for service providers in China.

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