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POPULAR OPINION LEADER INTERVENTION FOR HIV STIGMA REDUCTION IN HEALTH CARE SETTINGS

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Abstract

This study used the Popular Opinion Leader (POL) model to reduce stigma among service providers. The authors focused on the dissemination of intervention messages from trained POL providers to their peer providers and the change of intervention outcome over time. The sample included 880 service providers from 20 intervention hospitals. The levels of message diffusion, prejudicial attitude toward people living with HIV (PLH), and avoidance intent to serve PLH were self-reported at baseline, 6 months, and 12 months. At 6 months, POL providers showed a significantly higher level of message diffusion and lower levels of prejudicial attitude and avoidance intent than non-POL providers. However, such discrepancies diminished at 12 months. The results support the utility of the POL model in stigma reduction interventions. The observed changes were documented not only in POLs but also in non-POLs after a certain period of time. This finding informed the design and implementation of future stigma reduction efforts and POL intervention programs.

Diffusion of Innovations Theory focuses on how a new practice or idea can be dispersed through a social network to the point that it becomes a social norm (Rogers, 1983). It has been suggested that when a “critical mass” of popular opinion leaders (POLs) in a social group begin to model a new behavior, they alter the perception of what is normative. This theoretical model has been applied to numerous HIV-focused behavioral intervention studies, and the effects of these interventions on risk reduction have been evaluated among a variety of populations (Berner et al., 2003; Bertrand, 2004; Collins, Harshbarger, Sawyer, & Hamdallah, 2006; Dearing, 2009; Kelly et al., 1991, 1997; Miller, Klotz, & Eckholdt, 1998;

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The NIMH Collaborative HIV/STD Prevention Trial Group, 2010; Rodgers & Rowe, 1993; Rotheram-Borus et al., 2011b; Sikkema et al., 2000; Soumerai et al., 1998).

Diffusion of Innovations Theory has great potential as a theoretical framework for stigma-reduction interventions. For example, Young and colleagues (2011) examined the effect of a community intervention using the POL model among 3,049 participants in coastal Peru, with intervention participants reporting lower levels of HIV-related stigma at 12- and 24-month follow-up assessments. Another large-scale intervention designed to engage community POLs among food market vendors to convey HIV risk reduction messages resulted in a reduced level of HIV-related stigma among the target population (Li et al., 2010). In a previous study, we identified the potential to adapt the POL intervention model to address HIV stigma and improve quality of care among service providers in China. Service providers are a relatively stable population with their own social network, and there are natural leaders within the network who influence their peer coworkers (Li et al., 2007a).

In light of such evidence, we conducted a randomized controlled trial to assess the efficacy of a POL intervention to reduce service providers' stigmatizing attitudes and behaviors toward people living with HIV (PLH) in China. Opinion leaders were identified and trained to deliver intervention messages to peer providers in their medical communities. In a separate article authored by the same research team, we reported the main intervention outcome by comparing the change of outcome measures over time between intervention conditions (Li et al., 2013). Compared with service providers in the control condition, providers in the intervention condition showed significantly decreased prejudicial attitudes and avoidance intent to treat PLH in 6- and 12-month follow-up surveys (Li et al., 2013). On the basis of effective intervention outcomes, this article aims to further describe the characteristics of POLs, explore the difference in message diffusion between POL providers and non-POL providers, and compare the attitudinal and behavioral changes over time in both POL and non-POL providers. Findings from this investigation could contribute to the literature by unpacking the process of message diffusion in a target population and exploring possible norm shifts as part of the intervention effects at the community level.

METHODS

STUDY DESIGN AND PARTICIPANTS

The full study was conducted in Fujian and Yunnan Provinces, China, from October 2008 to February 2010. A total of 40 county-level hospitals (20 in each province) were randomly selected from 214 county hospitals within two provinces using a random number table. The selected hospitals were matched into pairs within each province, and each pair of hospitals was randomized to either the intervention condition or the control condition. A detailed description of the study design can be found elsewhere (Li et al., 2013). This article focuses on the 20 hospitals in the intervention arm of the trial.

For each of the 20 hospitals, we randomly sampled 44 service providers, resulting in a total of 880 provider participants in the study. The inclusion criteria for service providers were: (a) participants must be 18 years or older and (b) participants must have regular contact with patients in the hospital. When approaching participants, research staff followed a standardized script to explain the purpose of the study, procedures, voluntary participation, and potential risks and benefits. Written informed consent was obtained; the refusal rate was about 3%. The study was approved by the Institutional Review Boards of UCLA and the National Center for AIDS/STD Control and Prevention, Chinese Center for Disease Control and Prevention.

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IDENTIFICATION OF POPULAR OPINION LEADERS

A POL was defined as a service provider who is respected, trustworthy, and influential among coworkers, and whose advice would be taken seriously by his or her peers. POL participants were expected to demonstrate concern for their medical community and be willing to make efforts to improve the quality of services provided in the hospital. To identify POLs with such characteristics, a combination of three strategies was used: (a) hospital stakeholders and department leaders recommended persons known to be socially influential and well-respected; (b) during the baseline assessment, randomly selected providers were asked to nominate the three most popular and influential providers in their hospital; and (c) research team members conducted field observations of potential candidates' interactions with their coworkers to verify the popularity of nominees and categories of their social network. A similar procedure was used in a previous intervention trial among food market vendors in China (Rotheram-Borus et al., 2011a). With informed consent, approximately 20–25 POLs (15% of all providers) were recruited from each of the 20 intervention hospitals, yielding a total of 456 POLs who participated in the intervention. The process of identifying POLs was separated from the recruitment of the study sample. Therefore, although the selected POLs participated in the intervention activities, not all of them were included in the assessment sample of the trial.

INTERVENTION

The intervention included an initial training of four weekly group sessions over a 1-month period and three reunion sessions during the 12-month follow-up period. The sessions typically lasted about 1.5 hours in a conference room of the hospital. The titles of the four basic intervention sessions (which also served as the intervention messages) were: (a) complying with universal precaution procedures and ensuring occupational safety; (b) fighting against stigma and improving the patient–provider relationship; (c) taking actions and making efforts to care for patients; and (d) overcoming difficulties and building a better medical environment. The four intervention messages used in this project were designed based on findings from our formative studies and reflect real-world challenges faced by service providers in China.

The group sessions were interactive in nature and included group discussions, games, and role-plays in order to encourage trainees' full participation. POL providers were instructed to diffuse the intervention messages to their coworkers. The target audience could be any service providers in the hospitals regardless of their POL status, and not necessarily those who participated in the study. Communication techniques were used to help the POLs learn and practice their skills to effectively deliver the intervention messages to their peer providers in the hospital. For example, POLs were taught to use the project logo as a conversation starter to advocate for the project; they were also encouraged to use their own experiences or real-life examples to link the intervention contents to the benefit of their coworkers and their medical environment. POLs set goals to engage in conversations with coworkers between weekly sessions, and the conversational outcomes were reported and discussed at subsequent sessions.

Three reunion sessions were held about every 3 months after completion of the four initial sessions to maintain the effect of the intervention over time. The reunion activities focused on group solidarity, problem solving, and skill building. During each reunion, the intervention messages were reviewed, POLs' diffusion activities to peers were reported, and obstacles and solutions were discussed to reinforce efforts. The participation rate for the intervention activities was about 95%.

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OUTCOME MEASURES

At baseline and at the 6- and 12-month assessments, each of the providers who were followed up completed a self-administered paper-and-pencil questionnaire in a private room, with a trained interviewer available to answer questions. The survey took an average of 30 to 45 minutes to complete. Participants were compensated 50 yuan (US$8.00) for each assessment. The follow-up rate was greater than 95% across all study sites.

A scale to measure *Diffusion of HIV Care Messages* was developed and validated in a previous investigation (Li et al., 2007a). The scale was used in this study to assess the level of communication related to care for PLH with coworkers or friends among service providers. This variable was measured by six statements, with response categories from 0 (*none*) to 3 (*frequently*) to assess how often the service provider discussed the following topics with coworkers or friends: (a) protecting themselves from HIV infection by following universal precaution procedures; (b) providing equal quality of service to all patients, including PLH; (c) not discriminating against PLH when seeking health services; (d) protecting the confidentiality of PLH; (e) treating patients with compassion; and (f) being a responsible person in the medical community. These items were constructed into a continuous scale in which higher scores indicate higher levels of diffusing positive messages to peers (Cronbach's alpha = 0.86).

General Prejudicial Attitude toward PLH was piloted and validated previously (Li et al., 2007b). In this study, eight items were included with response ranges from 1 (*strongly agree*) to 5 (*strongly disagree*). Example statements included, "People who got HIV/AIDS through sex or drug use got what they deserved" and "AIDS is a punishment for bad behavior." Some items were reversed so that a higher score indicated a higher level of prejudicial attitude toward PLH (Cronbach's alpha = 0.75).

The *Avoidance Intent* scale was the modified version of a previously validated measure (Li et al., 2009). Eight hypothetical situations were listed to assess the level of avoidance intent toward PLH when participants performed their daily medical work. Example statements in this scale included, "If HIV-positive patients visit the hospital, you are willing to provide all service needed" and "If you worked with HIV-positive patients, you would provide the same quality of care to them that you provide to other patients." The responses to each statement ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). A higher score indicated a higher potential of avoidance when providing service to PLH (Cronbach's alpha = 0.84).

We also collected variables on providers' background information such as age, gender, profession (doctor, nurse, or lab technician), and whether a provider had prior experience in treating or contact with PLH (yes or no).

STATISTICAL ANALYSIS

Baseline differences between POL and non-POL providers were tested using chi-square and *t* tests for categorical and continuous variables, respectively. Mixed-effects regression models that included provider's characteristics (age, gender, profession, and prior contacts with PLH), POL status, visit, and POL-by-visit interaction were used to assess (a) whether the change in outcome measures from baseline was significant for the POL or non-POL providers, and (b) whether the difference in change scores between the POL and non-POL groups was significant. These comparisons were done through model contrasts. The models also included hospital-level random effects to account for dependence within hospitals and a first-order autoregressive covariance structure to account for repeated observations per provider. All statistical analyses were carried out with the SAS System for Windows (Version 9.2).

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RESULTS

Among the 880 service providers in the assessment sample, slightly over half (51%) were POLs. Almost 62% of the non-POLs versus 69% of the POLs were women ($p = .0157$), and the average age of these providers was about 37. Fifty-three percent of non-POLs versus 47% of POLs were doctors. About 60% of POLs had prior contact with PLH, which was significantly higher than non-POLs (52%, $p = .0159$). No significant differences were observed for provider age and profession between POLs and non-POLs. The average score of message diffusion was significantly higher for POLs than for non-POLs at baseline (means: 11.1 [$SE = 3.6$] vs. 10.4 [$SE = 3.5$]; $p = .0048$). Comparable levels of general prejudicial attitude and avoidance intent between POLs and non-POLs were observed (Table 1). Not surprisingly, the score of message diffusion measure was negatively associated with both general prejudicial attitude ($r = -0.22$, $p < .0001$) and avoidance intent ($r = -0.30$, $p < .0001$).

Estimated longitudinal effects on the diffusion of messages, prejudicial attitude, and avoidance intent from the mixed-effects regression models are shown in Table 2. Providers who had prior contact with PLH were significantly associated with a higher level of message diffusion (Estimate = 0.763, $SE = 0.145$; $p < .0001$), and a lower level of prejudicial attitude (Estimate = −0.635, $SE = 0.196$; $p = .0012$) and avoidance intent (Estimate = −0.607, $SE = 0.151$; $p < .0001$). For the message diffusion measure, male providers (Estimate = −0.405, $SE = 0.178$; $p = .0231$) and doctors (Estimate = −0.468, $SE = 0.165$; $p = .0045$) were associated with a lower level of diffusing messages. Older providers were associated with a higher level of general prejudicial attitudes (Estimate = 0.024, $SE = 0.012$; $p = .0431$), and male providers were associated with a lower level of avoidance intent than female providers (Estimate = −0.435, $SE = 0.1841$; $p = .0181$).

The changes over time for POLs and non-POLs were estimated through the model contrasts. At each follow-up assessment, we observed a significant improvement in message diffusion for both POLs and non-POLs. The estimated improvement in message diffusion for POLs was 3.122 ($SE = 0.169$, $p < .0001$) and 3.480 ($SE = 0.199$, $p < .0001$) at the 6- and 12-month follow-up assessments, respectively. For non-POLs, the estimated improvement in message diffusion was less (1.834 and 2.912 at 6- and 12-month follow-ups, respectively), but still reached statistical significance. Both POLs and non-POLs showed significant reductions in prejudicial attitude at 6- and 12-month follow-ups. The estimated reduction in prejudicial attitude for POLs was 3.608 at 6 months and 4.792 at 12 months, while the estimated reductions for non-POLs were 1.945 and 4.556 at 6 months and 12 months, respectively. Similarly, the avoidance intent was significantly reduced for both POLs and non-POLs at both 6- and 12-month follow-ups (Table 2).

Next, we estimated the difference in change from baseline between POLs and non-POLs at each follow-up using the mixed-effects regression model, adjusting for age, gender, occupation, and prior PLH contact, through the model contrasts. At the 6-month follow-up, POLs showed significantly more improvement on message diffusion than non-POLs (Estimated difference in improvement = 1.288, $SE = 0.242$, $p < .001$). However, the difference of change in message diffusion at the 12-month assessment did not reach statistical significance (Estimated difference in improvement = 0.567, $SE = 0.202$, $p = .0525$). Similarly, we observed more reduction of prejudicial attitude measure among POLs at 6 months, as compared to non-POLs (Estimated difference in reduction = 1.663, $SE = 0.322$, $p < .0001$), but the reductions in prejudicial attitude measure between POLs and non-POLs were similar at the 12-month follow-up (Estimated difference in reduction = 0.236, $SE = 0.391$, $p = .546$). For the avoidance intent indicator, we observed no significant differences between the two groups at either follow-up assessment.

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DISCUSSION

As a community-level intervention, the POL model has the potential to reach a large number of people by using natural social networks and by adapting to different cultures and populations (Kelly et al., 1997; The NIMH Collaborative HIV/STD Prevention Trial Group, 2007; Pinkerton, Holtgrave, DiFranceisco, Stevenson, & Kelly, 1998). Although a number of POL interventions have been evaluated, there is a lack of studies on the specific mechanisms responsible for the intervention effect. This study is among the first to attempt to distinguish the intervention effect on POLs versus non-POLs and to explore patterns of message diffusion among the two groups. To observe shifts in community norms over time, it is necessary to assess if the changes were simply from trained opinion leaders themselves or from other community members not involved in the training. Our data confirmed a desirable outcome for both groups.

Several important trends were observed from the longitudinal data. Although other behavioral intervention studies have reported an immediate intervention effect that decays over time (e.g., Albarracín, Durantini, & Earl, 2006; Koniak-Griffin, Lesser, Takayanagi, & Cumberland, 2011), we observed the opposite in this study: The change in POL and non-POL attitudes started to show as early as the 6-month follow-up, and such change became more robust at the 12-month follow-up. In addition, the difference in prejudicial attitude and avoidance intent between POLs and non-POLs was most significant at the 6-month follow-up, and non-POLs started to catch up at the 12-month follow-up. The results suggest that it might take a relatively longer time for intervention messages to be conveyed by POLs than by non-POLs and for the non-POLs to adopt the change in a community. The patterns were parallel to the other changes observed: Differences in message diffusion and prejudicial attitude between POLs and non-POLs peaked at 6 months and became trivial by the time of the 12-month assessment. We speculate that given sufficient time, non-POLs could not only make changes targeted by the intervention, but also could diffuse positive messages within their social networks under the influence of trained POLs. These findings support the underpinnings of the POL model (i.e., of norm shifts at the community level).

An important step for the success of a POL intervention is to identify popular, credible, and trusted POLs in the targeted social networks (Kelly, 2004). The POL providers in this study reported significantly higher levels of message diffusion than non-POLs at baseline, suggesting that the strategies used in POL selection were effective in terms of identifying those who were more capable of communications and more willing to share their thoughts with their coworkers. We also found that female providers reported a higher level of message diffusion, and they were more likely to be selected as a POL; this result was consistent with our previous findings (Li et al., 2007a). Previous researchers have reported that women in general are much more involved and active in communication and social activities than men (Behrman, Kohler, & Watkins, 2002; Shklovski, Kraut, & Rainie, 2004). Nevertheless, the selection of POLs should not be limited to women because the characteristics of POLs should be diversified to cover multiple population segments (The NIMH Collaborative HIV/STD Prevention Trial Group, 2007). We also found that prior contact with PLH by providers was significantly associated with more HIV care discussions within their social network. These characteristics of POLs have implications for the design and implementation of future intervention programs targeting stigma in health care settings.

There are two major limitations of this study. First, the outcome measures relied exclusively on self-reported data, so issues surrounding social desirability bias can be raised. Second, the data were collected only from county-level hospitals in two provinces, so caution must be used in generalizing the findings to other geographic locations and other types of hospitals. Notwithstanding these limitations, our study provides insight into the course of

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message diffusion and intervention outcomes and evidence of diffusion of innovation from trained POLs to peer providers in health care settings. The POL model can be an effective approach in the battle of tackling HIV-related stigma and discrimination in health care settings.

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TABLE 1

Demographic and Baseline Characteristics (N = 880)

Parameter	non-POL	POL	*p*
N	424	456	
Age			
Mean (*SD*)	37.16 (8.35)	37.71 (7.99)	0.3178
Female	261 (61.6%)	316 (69.3%)	0.0157
Profession			0.0786
Doctor	226 (53.3%)	216 (47.4%)	
Others	198 (46.7%)	240 (52.6%)	
HIV Contact	220 (52.0%)	274 (60.1%)	0.0159
Outcome Measures at Baseline			
Mean (*SD*)			
Message Diffusion	10.42 (3.52)	11.09 (3.60)	0.0048
Prejudicial Attitude	21.17 (4.61)	20.80 (4.26)	0.2113
Avoidance Intent	18.88 (4.28)	18.45 (4.17)	0.1311

Note. POL = popular opinion leader.

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TABLE 2

Results From Mixed-Effects Regression Models for POLs Versus Non-POLs

	Message Diffusion			Prejudicial Attitude			Avoidance Intent		
Parameter	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***	**Estimate**	***SE***	***p***
Age	0.010	0.009	0.2636	0.024	0.012	0.0431	0.003	0.009	0.7015
Gender (Male/Female)	−0.405	0.178	0.0231	−0.019	0.239	0.9381	−0.435	0.184	0.0181
Doctor	−0.468	0.165	0.0045	0.039	0.221	0.8594	0.084	0.170	0.6210
Prior contact PLH	0.763	0.145	< .0001	−0.635	0.196	0.0012	−0.607	0.151	< .0001
POL			< .0001			0.0003			0.0991
Visit			< .0001			< .0001			< .0001
POL × Visit			< .0001			< .0001			0.0714
Change = Follow-up – Baseline									
POL									
6-month	3.122	0.169	< .0001	−3.608	0.225	< .0001	−1.294	0.178	< .0001
12-month	3.480	0.199	< .0001	−4.792	0.266	< .0001	−1.679	0.207	< .0001
non-POL									
6-month	1.834	0.177	< .0001	−1.945	0.236	< .0001	−0.898	0.186	< .0001
12-month	2.912	0.215	< .0001	−4.556	0.287	< .0001	−1.839	0.223	< .0001
Difference in Change (POL – non-POL)									
6-month	1.288	0.242	< .0001	−1.663	0.322	< .0001	−0.396	0.254	0.1192
12-month	0.567	0.292	0.0525	−0.236	0.391	0.546	0.160	0.304	0.5992

Note. PLH = people living with HIV, POL = popular opinion leader.