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Mass Media and HIV/AIDS Prevention Among Female Sex Workers in Beijing, China

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Abstract

The current study aimed to identify the sources of HIV prevention information for female sex workers in Beijing and assess the associations between levels of mass media exposure of HIV/AIDS prevention information and HIV/AIDS knowledge as well as condom use–related attitudes, beliefs, and behaviors. Cross-sectional data were collected from 359 female sex workers in Beijing, China. Chi-square tests and one-way ANOVA tests were employed. Female sex workers sampled in Beijing were more likely to obtain HIV/AIDS prevention information from television and street posters than radio and the Internet. However, a higher level of exposure to and a lasting impression on online information were significantly associated with a higher level of condom use self-efficacy and more consistent condom use among the participants. Exposure to HIV/AIDS prevention information delivered by radio, street posters, and the Internet was found to be associated with sexual communication about HIV or condom use with sexual partners. Overall, this study provides preliminary evidence of the utility of various mass media outlets in delivering HIV/AIDS prevention information among female sex workers in China. Future studies are needed to systematically examine the effectiveness of mass media–based prevention education on HIV/AIDS related attitudes and behaviors among female sex workers and other populations in China.

An estimated 780,000 people were living with HIV/AIDS in 2011 in China. The number increased by 40,000 from 2009 (China Ministry of Health, 2012). Of the 780,000 people living with HIV/AIDS in 2011, 63.9% have been infected through sexual transmission, which was increased from 59% in 2009 (China Ministry of Health, 2012). Approximately 60% of new infections were through sexual transmission in 2007 and 74.7% in 2009; the number mounted up to 81.6% in 2011, which includes 52.2% heterosexual transmissions and 29.4% homosexual transmissions (China Ministry of Health, 2012). HIV prevalence showed a clear increasing trend among Chinese women: less than 10% of people living with HIV/AIDS were female in 1995, but this number changed to 28% in 2011 (China Ministry of Health, 2012).

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A recent systematic literature review revealed that female sex workers (FSWs) in China were at high risk of HIV/STIs (Hong, Poon, & Zhang, 2011). It was estimated that there could be as many as 10 million FSWs in China (Yang et al., 2005). National sentinel surveillance showed that HIV prevalence among FSWs ranged from 1% to 11%, which were much higher compared with the prevalence (<0.1%) in the general adult population (Hong et al., 2011). In addition, prevalence of STIs was as high as 40 to 85% among FSWs (Chen et al., 2005). However, approximately 60% of them did not consistently use condoms with clients, and 85% did not with their stable partners, including their boyfriends, spouses, or long-term clients (Hong & Li, 2008). Therefore, FSWs were considered as bridging groups and drivers of the epidemic (China Ministry of Health, 2012). Previous research has demonstrated a pervasive lack of awareness and knowledge of HIV/AIDS among FSWs in China because most of them are young women who migrated from poor rural areas to urban cities with limited education (Cai et al., 2010). In addition, inconsistent condom use is very common during commercial sex among Chinese FSWs (Gu et al., 2008). Therefore, it is imperative to develop HIV/AIDS education programs and condom promotion interventions targeting FSWs in China.

A substantial body of literature has demonstrated that mass media can be effective in delivering HIV/AIDS prevention campaigns or information. However, with very few exceptions (e.g., Li et al., 2009), limited data are available regarding the utility and effectiveness of the mass media channels from which the general public and particularly at-risk populations (e.g., FSWs) in China receive, understand, and process information and knowledge related to HIV risk reduction. In addition, Xiao, Noar, and Zeng's (2014) systematic review of 45 intervention studies conducted in China provided evidence that mass media have not been explored and used very often for HIV prevention in China. They found that most of the studies used a combination of printed materials (e.g., brochures, pamphlets, books, flyers), nonmedia channels (e.g., workshops/seminars, voluntary counseling and testing programs, didactic lectures, peer education or outreach), and visual materials (e.g., videos, audio tapes, VCDs, and cartoon folders) to deliver intervention messages. Only three studies used the Internet as an intervention delivery channel, and only one study mentioned that radio and television were used to distribute intervention programming. Therefore, the current study was designed to examine whether exposure to HIV prevention information on various forms of mass media is associated with HIV-related knowledge and attitudes towards protected sex practice among Chinese FSWs.

Theoretical Rationale

One important theoretical framework for the study of mass media exposure is Gerbner's (1973) cultivation theory, which hypothesizes that exposure to television affects viewers' attitudes in a way so that their attitudes conform to the opinions and messages on TV. Cultivation studies have most frequently examined the relation between TV violence viewing and perceptions of real-world violence (Gerbner, Gross, Morgan, & Signorielli, 1980). Two primary methods, including content analysis of TV violence and survey data analysis, have been used in general cultivation studies (Niederdeppe, Fowler, Goldstein, & Pribble, 2009). Most studies identified a small but significant relation between TV violence viewing and beliefs about real-world violence (Shanahan & Morgan, 1999).

Research on mass media exposure has extended beyond Gebner's (1973) original hypothesis. For instance, Rimal, Rlora, and Schooler (1999) analyzed two waves of cross-sectional data from the Stanford Five-City Campaign that targeted improving health behaviors such as diet, smoking, and exercise. They found that exposure to campaign messages was associated with health information seeking, interpersonal communication, and health behaviors. Snyder and Hamilton (2002) meta-analyzed 48 health campaigns and found that campaigns with greater reach/exposure had greater effects. However, they pointed out that their meta-analysis study only measured short-term effects and the campaign studies reviewed had only an average campaign effect size ($r = .09$) on behavior, which meant that only 9% more people performed the promoted behavior after the campaign than before and long-term effects could be even less because some people would back-slide into their old behaviors.

Brashers, Goldsmith, and Hsieh (2002) stated, "Mediated sources offer additional opportunities for mass and interpersonal communication aimed at health information seeking and providing" (p. 260). Because of the function of offering these opportunities, the mass media have been used around the world as an educational tool to raise awareness of HIV/AIDS and to educate the general public on HIV's transmission routes and prevention methods (Li et al., 2009; Myhre & Flora, 2000). For example, the radio soap opera, *Twende na Wakati* ("Let's Go With the Times"), has significantly increased the willingness among the audience in Tanzania to discuss and talk about HIV-related issues since it was first broadcast in 1993 (Singhal & Rogers, 1999). Program evaluations reported that 65% of respondents had spoken to someone about *Twende na Wakati*.

The mass media can also be used for promoting HIV/AIDS-related attitude and behavior changes among different at-risk populations. For example, Noar and colleagues (2009) reviewed 38 HIV/AIDS mass media campaign studies that were conducted in 23 countries and published in the literature between 1998 and 2007. They found that well-controlled mass media campaigns did demonstrate effects on behavior or behavioral intention. In addition, the Two-Cities Safer Sex media campaign conducted by Zimmerman and colleagues (2007) in the United States suggests that high-sensation-value televised messages were effective in increasing condom use intentions, condom use self-efficacy, and actual condom use among target audience. Furthermore, Bertrand and associates (2006) systematically reviewed the effectiveness of 24 mass media campaigns that were conducted to change HIV/AIDS-related behaviors in developing countries. They found the most frequently examined outcomes include condom use, HIV transmission knowledge, sexual risk behavior, perceived risk of contracting HIV/AIDS, interpersonal/sexual communication, self-efficacy to negotiate condom use, and abstinence. In the LoveLife program in South Africa, the mass media campaign along with face-to-face communications was found to be associated with increased use of condoms and decreased number of sexual partners (Romer et al., 2009).

Several previous studies also examined the effectiveness of different mass media channels in delivering health-promotion messages. For example, Derzon and Lipsey (2002) conducted a meta-analysis of 72 published and unpublished studies of public health campaign. They found that campaigns utilizing radio, video, and television had greater effects than those

using print media in preventing or reducing substance use among young people. Other researchers found that, compared to campaigns using channels such as radio or print media, campaigns that used television have the strongest impact on raising HIV/AIDS awareness, increasing transmission knowledge, improving interpersonal communication, and promoting behavioral change (Keating, Meekers, & Adewuyi, 2006). In India, more than 70% of respondents reported that their information on HIV/AIDS were received from television (Sood & Nambiar, 2006). Approximately 72% of Americans have identified television, radio, and newspapers as the primary sources of HIV/AIDS-related information (Omoera, Awosola, Okhakhu, & Adesina, 2010). In addition, the Internet has become a promising tool in health education and promotion efforts because of its great popularity as a primary source for seeking health information (Noar, Clark, Cole, Lustria, 2006) and its broad reach and interactivity (Ybarra & Bull, 2007).

The mass media might be a better channel to reach Chinese FSWs for HIV prevention education for several reasons. First, commercial sex in China is illegal, which makes most of the FSWs to be underground and hard to reach. According to Burris and Xia (2009), criminal law enforcement on sex work actually affects public health social workers' ability to effectively deliver prevention information among sex workers. In their study, social workers described their experience of doing outreach among sex workers. For example, one worker said, "The young lady, like a mirage, disappears when you approach [her]" (p. 187). In addition, there is a society-level stigma and discrimination from the general public and health care providers that views FSWs as immoral or bad in character (Lau, Choi, Tsui, & Su, 2007). Therefore, some FSWs in China might be reluctant to seek information from other venues (e.g., interpersonal communication) besides the mass media, which might be better sources of information they can or be willing to access.

Given the important role of FSWs in the HIV epidemic in China and the lack of empirical data on the utilization and effectiveness of mass media in HIV prevention among this most-at-risk population, the present study specifically aimed to (a) identify the sources and level of mass media exposure of HIV prevention information for FSWs in Beijing; and (b) to assess the associations between levels of mass media exposure of HIV/AIDS prevention information and HIV/AIDS knowledge as well as condom use-related attitudes, beliefs, and behaviors.

Method

Participants

A confidential paper-and-pencil survey was conducted. All the participants were recruited from entertainment venues (e.g., karaoke bars and Sanus Per Aquam [SPA]) in an urban district in Beijing, China. Beijing has an estimated 17.4 million residents, of which 5.4 million were migrants (Yi, Mantell, Wu, Lu, Zeng, & Wan, 2010). According to Qian, Vermund, and Wang (2005), sex worker population in Beijing are mainly made up of migrants. It has been a concern that the expanded sexual network among migrants along with urbanization would spur the spread of HIV epidemic in China (Anderson, Qingsi, Hua, & Jianfeng, 2003). Surveillance data demonstrated that this concern did not come from

nowhere. For example, in 2008, 75.1% of the 5,635 HIV/AIDS cases reported in Beijing were migrants (Yi et al., 2010).

All of the participants were ensured of confidentiality of their participation, and required to read and sign consent forms before participating in the survey. A total of 359 FSWs participated in the study.

Survey Procedures

The local research team including the local Centers for Disease Control and Prevention (CDC) workers approached the venues that were known to the local CDC for providing commercial sex service in the district and obtained the permission from the owners or gatekeepers to conduct the study in the venues. Once receiving the permission from the owners or gatekeepers, the local research team approached the FSWs in their venues to ask them for participation. Health workers from the local CDC visited the venues very frequently before the conduction of the survey to build rapport with both the owners and FSWs.

To ensure participants' safety and privacy, the participants completed a self-administered questionnaire privately in the venues they were recruited from. The interviewers were graduate students and faculty from a local university and health workers from the local CDC. Before the survey, all interviewers received extensive training on research ethics and assessment methodology. When necessary, the interviewers were available to answer and clarify any questions that arose during the survey. It typically took about 45 min to complete the questionnaire. The study received institutional review board approvals at Wayne State University in the United States and Beijing Normal University in China.

Measures

HIV/AIDS Information Sources and Exposure—HIV/STD information sources were assessed by asking the questions “In the past 6 months, did you ever hear or see information about HIV/AIDS prevention (e.g., public service announcements, stories, etc.) from the following sources? If yes, did the information impress you?” The information sources included television, radio, street posters, and the Internet/blog. Response options for each source were “No, I did not hear or see”; “Yes, but it left little impression”; or “Yes, it left a lasting impression.”

HIV/AIDS Knowledge—HIV/AIDS knowledge was assessed using a 20-item self-report instrument. The instrument was adapted from previously published measures of transmission routes, misconceptions about transmission, and risk reduction strategies (see Huang, Bova, Fennie, Rogers, & Williams, 2005). Respondents were asked to indicate “true” or “false” for a number of statements (e.g., “You can acquire HIV from kissing and sneezing.”) An index was created by counting up the number of correct answers that each respondent gave. The highest possible score was 20.

HIV Vulnerability—Respondents were asked how likely they would get HIV. Response options ranged from 1 (*not possible at all*) to 4 (*very possible*).

HIV/AIDS Awareness—Respondents were asked how much they knew about HIV/AIDS. Response options ranged from 1 (*nothing at all*) to 4 (*a lot*).

Condom Use With Regular Partners—Respondents were asked how often they used a condom during sex with their regular partners. Respondents were given a 5-point scale ranging from 1 (*never*) to 5 (*always*).

Condom Use With Casual Partners—Respondents were asked how often they used a condom during sex with their casual partners. Respondents were given a 5-point scale ranging from 1 (*never*) to 5 (*always*).

Condom Use With Regular Partners in the Past Three Episodes—Respondents were asked whether they used a condom during the past three sexual occasions with their regular partners. Respondents were given a 4-point scale ranging from 1 (*none*) to 4 (*three times*).

Condom Use With Casual Partners in the Past Three Episodes—Respondents were asked if they used a condom during the past three sexual occasions with their casual partners. Respondents were given a 4-point scale ranging from 1 (*none*) to 4 (*three times*).

Condom Use Attitudes—Condom use attitudes were assessed using 14 items reflecting respondents' attitudes toward positive and negative consequences of condom use (Sacco, Levine, Reed, & Thompson, 1991). Sample statements include "Condoms reduce the spontaneity of sex" and "Condoms decrease sensation during intercourse." All items used a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach alpha for the 14 items was .91 for the present study's sample.

Condom Use Self-Efficacy—We assessed self-efficacy using nine items asking respondents how confident they were about using condoms in a variety of situations (Redding & Rossi, 1999). Sample statements include "I will be able to use condoms when I am high on alcohol or drugs." Response options range from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach alpha was .92.

Sexual Communication—Respondents were asked to indicate whether each of the 10 statements related to discussion of sex and condom use with their partners was true to them (Milausen et al., 2007). Sample statements include "I talk frequently with my partners about condom use." Response options were "very untrue," "untrue," "neither untrue nor true," "true," and "very true." Items were recoded when necessary so that a higher score reflected higher level of sexual communication. Cronbach alpha was .71.

Demographics—Respondents were also asked to provide information on their demographic characteristics, including age, ethnicity (Han and other), type of hometown (city, county, township, rural), monthly income, education level (years of schooling), and marital status (single; single but living with a partner; married; divorced, widowed, or separated).

Data Analysis

Descriptive statistics were used to describe demographic characteristics and characteristics of mass media exposure of HIV/AIDS prevention information. Chi-square tests or one-way analysis of variance tests were used to examine demographic characteristics of mass media exposure of HIV/AIDS prevention information. One-way analysis of variance tests were also used to investigate the associations between HIV/AIDS information sources and variables such as HIV/AIDS knowledge, condom use attitudes, condom use self-efficacy, and condom use behaviors.

Results

Demographic Characteristics

The study sample consisted of 359 FSWs. Participants' age ranged from 18 to 36 years ($M = 25.04$ years, $SD = 3.53$ years). Han is the majority ethnic group ($n = 326$, 92.4%). In the sample, 139 (40.6%) participants were from rural areas, and 225 (63.9%) were not married. In addition, about half of the participants ($n = 193$, 54.5%) had 9 years of schooling. Approximately 42.5% of the sample reported having monthly income of 3,000 yuan (US \$472) or less. Table 1 presents the demographics of the sample.

Demographic Correlates of Mass Media Exposure of HIV/AIDS Prevention Information

Television—Eighty-three (23.3%) participants reported that they were not exposed to any televised HIV/AIDS information at all (see Table 2). About half of the participants ($n = 192$, 53.6%) reported receiving televised HIV/AIDS prevention information, but the information did not leave much impression on them. However, 81 (22.6%) reported receiving televised HIV/AIDS prevention information and such information left a lasting impression on them. Levels of exposure to televised HIV/AIDS prevention information were significantly related to different hometown types ($\chi^2 = 13.08$, $p < .05$). Levels of exposure were not significantly related to participants' age, total migration times, education and other demographic variables.

Radio—Two hundred and ten (61.8%) participants reported that they did not receive any HIV/AIDS prevention information from radio programs. Approximately one third of the sample ($n = 115$, 33.8%) reported that they received such information from radio but the programs were not impressive. Only 15 (4.4%) reported that they received HIV/AIDS prevention information from radio and the information was impressive. Levels of participants' exposure to HIV/AIDS prevention information delivered by radio was significantly related to different monthly income ($F = 15.87$, $p < .001$), but was not significantly associated with other demographic variables.

Street Posters—Approximately one third ($n = 137$, 38.8%) of the sample reported that they did not see any street posters on HIV/AIDS prevention. About 41.4% participants reported seeing some street posters on HIV/AIDS prevention but these posters left little impression on the participants. And 70 (19.8%) reported seeing some impressive HIV/AIDS prevention street posters. Exposure to HIV/AIDS prevention information delivered by street posters was only significantly related to marital status ($\chi^2 = 16.49$, $p < .05$).

Internet—About half ($n = 172$, 50.3%) participants did not acquire any HIV/AIDS prevention information from the Internet. And 147 (43%) reported seeing online HIV/AIDS prevention information, but they did not have much impression of the information. Only 23 (6.7%) reported that they saw impressive HIV/AIDS prevention information from the Internet. Level of exposure to online HIV/AIDS prevention information was only significantly associated with the number of cities the participants migrated to ($F = 3.39$, $p < .05$).

Media Exposure of HIV/AIDS Prevention Information and Condom-/HIV-Related Variables

Television—One-way analysis of variance tests (see Table 3) demonstrated that exposure to televised HIV/AIDS prevention information was significantly related to condom use self-efficacy ($p < .01$), condom use with regular partners ($p < .01$), and the perceived likelihood of contracting AIDS ($p < .05$). Post Hoc comparison tests show that a higher level of exposure to and a lasting impression on the information were significantly associated with a higher level of condom use self-efficacy, more condom use with regular partners, and more perceived likelihood of contracting AIDS.

Radio—Exposure to radio delivered HIV/AIDS prevention information was associated with condom attitudes ($p < .05$), condom use with regular partners in the past three episodes ($p < .05$), HIV/AIDS awareness ($p < .01$), and sexual communication with partners about HIV or condom use ($p < .001$). Post hoc comparison tests show that a higher level of exposure to and a lasting impression on such information were significantly associated with more positive condom attitudes, more condom use with regular partners in the past three episodes, more knowledge about AIDS, and more effective sexual communication about HIV or condom use with sexual partners.

Street Posters—Exposure to street posters was associated with HIV knowledge ($p < .05$), condom attitudes ($p < .05$), condom use self-efficacy ($p < .05$), condom use with regular partners ($p < .05$), HIV/AIDS awareness ($p < .05$), perceived likelihood of contracting AIDS ($p < .001$), and sexual communication ($p < .001$). Post hoc comparison tests show that a higher level of exposure to and a lasting impression on such information were significantly associated with more correct HIV knowledge, a higher level of condom use self-efficacy, more condom use with regular partners, more knowledge about AIDS, more perceived likelihood of obtaining AIDS, and more effective sexual communication about HIV or condom use with sexual partners.

Internet—Exposure to online HIV/AIDS prevention information was associated with HIV knowledge ($p < .001$), condom use self-efficacy ($p < .05$), condom use with regular partners ($p < .001$), condom use with casual partners ($p < .05$), condom use in the past three episodes with regular partners ($p < .001$), HIV/AIDS awareness ($p < .05$), perceived likelihood of contracting AIDS ($p < .05$), and sexual communication about HIV or condom use with partners ($p < .001$). Post hoc comparison tests show that a higher level of exposure to and a lasting impression on such information were significantly associated with more correct HIV knowledge, a higher level of condom use self-efficacy, more condom use with regular and casual partners, more condom use in the past three episodes with regular partners, HIV/

AIDS awareness, more perceived likelihood of contracting AIDS, and more effective sexual communication about HIV or condom use.

Discussion

Guided by the cultivation theory, the current study was designed to examine levels of exposure to HIV/AIDS information delivered by mass media and the relations between levels of exposure and condom/HIV-related variables among a sample of young FSWs (mean age of 25 years old) in Beijing, China. Although sampled in an urban area, the majority (64.6%) of the sample was from rural areas or small towns (see Table 1). Also, the majority (67.3%) had no more than 9 years of formal schooling. These data were consistent with Cai and colleagues' (2010) study, which stated that FSWs in China were young women who migrated from poor rural areas to urban cities with limited education. In addition, China's urbanization has accelerated with a very fast pace due to the economic reform, and more than half of the population became urban dwellers for the first time in 2011 (Liang, Lu, & Wu, 2014). Therefore, it is critically important to develop prevention programs to increase HIV/AIDS-related knowledge and promote protected sex among FSWs in urban areas of China. However, future studies cannot just place migrant FSWs in one category. In China, economic migration (e.g., for better jobs or opportunities in urban areas) was a motive for a lot of migrants (Yang & Guo, 1999). However, some female migrants were socioeconomically disadvantaged relative to male migrants, facilitating their entry into sex work industry (Yi et al., 2010). Some other female migrants already engaged in sex work in their hometowns, but the illegal situation of sex work "pushes FSWs to move away from their hometowns or change workplaces frequently within or between cities to avoid being identified" (Hong, Li, Yang, Fang, & Zhao, 2009, p. 218). Therefore, future research needs to differentiate FSWs in HIV/AIDS risks due to their different migrant status.

This study produced multiple important findings. First, cultivation analysis can be extended to investigate the relation between exposure to other genres of mass media besides television (e.g., street posters, radio, Internet) and other beliefs (e.g., condom use self-efficacy, perceived likelihood of contracting AIDS) besides the beliefs about the nature of the world. Second, cultivation analysis can be extended to investigate the relation between exposure to mass media and HIV/AIDS prevention-related behaviors, including condom use and sexual communication. However, when we contribute our findings to the application of the cultivation theory in our study, we also need to keep in mind that the original theory only focused on the overall effects of TV viewing (Gerbner, 1973) and did not assume that different genres of mass media could have divergent effects on beliefs (Lee & Niederdeppe, 2011). Although a lot of studies have demonstrated that cultivation effects can be genre- or program-specific, we still do not understand how the original overall and genre-specific cultivation effects affect each other, and when and how such cultivation effects occur among different genres of mass media. Given the fact that most cultivation analyses conducted cross-sectional studies to demonstrate the associations between TV viewing and beliefs (Lee & Niederdeppe, 2011), future longitudinal research is greatly needed to investigate the cultivation effects of different genres of mass media on HIV/AIDS prevention among Chinese.

Third, the present study found that television and street posters were more likely than radio and the Internet to be the channels from which the FSWs sampled acquired HIV/AIDS prevention information (see Table 2). This result is partially consistent with Huang and colleagues' (2005) study and Li and colleagues' (2009) study, which reported television was one of the important sources of HIV information. Also, this study found that a higher level of exposure to and a lasting impression on televised information had significant positive associations with condom use self-efficacy, condom use with regular partners, and perceived likelihood of contracting AIDS. These findings indicate that increased utilization of mass media, particularly via television, may be able to prioritize societal issues such as HIV/AIDS epidemic and sensitize at-risk groups on the issue of HIV/AIDS. Also, the findings suggest that the television medium might be a potential source of influence on individuals' perceptions, attitudes and behaviors related to HIV/AIDS and condom use. Given the facts that most media (especially television) are controlled by the Chinese government and most FSWs in China are migrant young women with limited education, it is possible that messages, themes, or stories of HIV/AIDS prevention and safer sex could be placed in prime time and daytime entertainment television programs. Entertainment-education approach has been able to effectively change health behaviors of low literacy audiences who otherwise might not be motivated to process a message (Singhal & Rogers, 1999). However, we must note that mass communication programs are not magic bullets that definitely produce recommended behavior change among target audiences. Mass communication could only have limited success for disease prevention and health promotion, especially when access to mass media is a controlled issue in China. In addition, specific reach to Chinese FSWs by mass media might also be limited due to their special characteristics (e.g., underground and illegal situation, having limited education, frequent migrations between urban cities). Therefore, a combination of mass communication plus other channels (e.g., interpersonal instructions, change of policy environment) would be required for tackling chronic problems, including HIV/AIDS.

In addition, our study contributes new and original information to the literature. Although only 19.8% of the participants reported that they had some lasting impression from the HIV/AIDS prevention street posters, street posters remain another potential channel to provide HIV/AIDS information and knowledge to populations that are at risk of HIV infection in China because 61.2% of the participants reported that they saw some HIV/AIDS-related street posters, and their lasting impression of the street posters was significantly associated with condom use with regular partners, sexual communication and condom self-efficacy. Although well-designed mass media campaigns have demonstrated effects on HIV-related behavior change or behavioral intentions in other countries, the effectiveness of well-designed street posters has seldom been documented, especially in China. Street posters could complement other media, such as television, Internet, and magazine, in promoting HIV/AIDS preventive behaviors. Future studies could use street posters in combination with other strategies, such as televised programs, to reduce HIV-associated sexual behavior among at-risk FSWs in China. Future studies could also use qualitative methods such as focus groups or in-depth interviews to examine what features make street posters produce lasting impression.

This study found about half of the sample did not acquire any HIV/AIDS prevention information from the Internet. However, a higher level of exposure to and a lasting impression on online information did have a significant association with a higher level of condom use self-efficacy and more consistent condom use among the sample surveyed. Although the state of Internet-based HIV prevention and intervention research is still preliminary in developed countries, some studies have reported promising results of Internet-based HIV prevention programs (Ybarra & Bull, 2007). However, in China, where Internet use has gained great popularity among the young population, very few researchers have developed Internet-based HIV prevention and safer sex education (Hong, Li, Mao, & Stanton, 2007; Xiao et al., 2014). The findings of the current study provide evidence that the Internet may be a promising channel to deliver HIV/AIDS prevention information for the large rural-to-urban migrant population (including FSWs) in China; and Internet-based interventions may be effective in increasing HIV/AIDS knowledge, condom use self-efficacy, and condom use. Future studies could develop more Internet-based HIV/AIDS education and prevention programs that focus on reaching out to migrant FSWs. And such programs would benefit from further research on the nature and barriers of Internet use for HIV/AIDS prevention information for this particular subpopulation with limited education.

Exposure to HIV/AIDS prevention information delivered by radio, street posters and the Internet was found to be associated with sexual communication. This finding concurs with Li and colleagues' (2009) argument that mass media exposure may promote interpersonal communications about HIV/AIDS. Sexual communication is an important determinant of condom use that has received much attention in HIV-related research in the United States (Bowleg, Valera, Teti, & Tschann, 2010). Some researchers found that partner sexual communications were also associated with condom use among various Chinese populations. For example, Xiao (2012) found that partner communication about condom use was the strongest predictor of condom use among Chinese college students sample, followed by condom use self-efficacy, subjective norms regarding condom use and positive health/relational attitudes. Another study explored the characteristics of sexual communications such as the topics of communication (e.g., condom use, HIV prevention, STDs prevention, sexual history, other sexual partnership) and target of communication (stable partners or casual partners) and their associations with condom use among a sample of MSM in Beijing (Xiao, Li, Liu, Li, & Jiang, 2013). This study found that sexual communications with regular partners about the aforementioned topics were associated with condom use with regular partners. Therefore, future research could highlight the significant role of mass media in influencing interpersonal/partner sexual communication about HIV/AIDS and condom use among at-risk Chinese populations, which in turn will affect their actual condom use.

Findings of the current study also suggest that exposure to HIV/AIDS information delivered by radio, street posters, and the Internet were significantly related to HIV knowledge and positive attitudes toward condom use. This highlights the crucial role of imbedding HIV/AIDS-related prevention information in mass media in influencing or cultivating HIV knowledge and attitudes. In addition, the findings of this study also underscore the importance of imbedding health information in different forms of media, which concur with Li and colleagues' (2009) conclusion that stated "...more comprehensive and multifaceted mass media programming could be particularly effective ..." (p. 435) in "influencing HIV

knowledge and attitudes, especially in the Chinese setting where HIV knowledge is low ...” (p. 434). This study, however, did not find that televised HIV/AIDS prevention information was associated with HIV knowledge and condom attitudes, which was inconsistent with previous studies that suggest television programs usually yield the strongest impact in terms of HIV/AIDS awareness, transmission knowledge, interpersonal communication and behavioral change, as opposed to campaigns using other forms of mass media, such as radio or print media (e.g., Chatterjee, 1999; Keating et al., 2006; Li et al., 2009; Sood & Nambiar, 2006). However, this study did find the majority of the sample (approximately 73%) reported that they were exposed to HIV/AIDS information from television programs and about 23% reported they had a lasting impression on these programs. These percentages are the highest compared to those of radio programs, street posters and the Internet. One of the possible explanations for this discrepancy between level of exposure to televised programs and its association with HIV knowledge and condom attitudes is that the televised information was not targeting to improve HIV/AIDS knowledge and condom attitudes. Rather, it focused more on actual condom use behavior and the susceptibility of HIV/AIDS.

Finally, several different demographic variables were related to the levels of exposure of HIV/AIDS prevention information delivered by different channels. For example, levels of exposure to televised information were significantly different among participants from different hometown types. Levels of exposure to radio programs were different among participants with different monthly income. Exposure to street posters was related to marital status. And exposure to online information had a relation with the number of cities the participants migrated to. Therefore, different demographic characteristics might also need to be considered when identifying matching channels for delivering HIV/AIDS education programs and condom promotion interventions among Chinese FSWs. More research studies are needed to further examine the usage of mass media for HIV/AIDS prevention information among different FSWs demographics.

The current study has several limitations. First, the data were cross-sectional and the results only indicate associations between mass media exposure of HIV/AIDS prevention information and condom/HIV-related variables, and are inadequate for identifying causal effects. Second, this study did not provide information about the nature and contents of the HIV/AIDS prevention information from these sources. Content analysis studies are needed in the future to find out what kinds of such information are available through Chinese mass media sources.

Overall, this study found that exposure to well-designed HIV/AIDS prevention information delivered by Chinese mass media is associated with HIV/AIDS knowledge as well as condom use-related attitudes, beliefs, and behaviors among Chinese FSWs, which provides evidence of the utility of various mass media outlets in cultivating proactive HIV/AIDS preventive beliefs, attitudes, and behaviors among migrant FSWs in China. However, future studies are needed to examine the cultivation function of media messages on Chinese people’s HIV/AIDS-related sexual behaviors.

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Table 1.

Demographics of the study sample

	<i>N</i>	%
Age, years ($M = 25.04$, $SD = 3.56$)		
20	34	9.6
21–25	167	47.0
26–30	147	41.5
31–36	7	2.1
Hometown type		
City	58	17.0
County	63	18.4
Township	82	24.0
Rural	139	40.6
Marital status		
Single	188	53.4
Single but living with a partner	37	10.5
Married	96	27.3
Widowed, separated, or divorced	31	8.8
Education, years ($M = 9.33$, $SD = 2.27$)		
6 years or fewer	42	11.8
9 years	193	54.5
12 years	105	29.6
Higher than 12 years of schooling	14	3.9
Monthly income (yuan), ($M = 4458.85$, $SD = 2285.12$)		
3,001 or less	152	42.5
3,001–5,000	99	27.1
5,001–8,000	79	22.1
8,001 or more	19	5.3

Table 2.

Mass media exposure of HIV/AIDS prevention information, by demographic

Demographic factor	TV			Radio			Street ads			Internet		
	1	2	3	1	2	3	1	2	3	1	2	3
Participants												
<i>n</i>	83	192	81	210	115	15	137	146	70	172	147	23
%	23.3	53.6	22.8	61.8	33.8	4.4	38.8	41.4	19.8	50.3	43	6.7
Age (years)												
20 or younger	9 (10.8%)	18 (9.5%)	7 (8.6%)	20 (9.7%)	9 (7.8%)	3 (20%)	12 (9%)	15 (10.3%)	6 (8.6%)	20 (11.7%)	10 (6.9%)	3 (13%)
21–25	40 (48.2%)	85 (45%)	42 (51.9%)	90 (43.5%)	60 (52.2%)	7 (46.7%)	58 (43.3%)	67 (45.9%)	39 (55.7%)	80 (46.8%)	68 (46.9%)	10 (43.5%)
26–30	33 (39.8%)	83 (43.9%)	29 (35.8%)	94 (45.4%)	42 (36.5%)	5 (33.3%)	63 (47%)	60 (41.1%)	23 (32.9%)	67 (39.2%)	64 (44.1%)	10 (43.5%)
31–36	1 (1.2%)	3 (1.6%)	3 (3.7%)	3 (1.4%)	4 (3.5%)	0 (0%)	1 (0.7%)	4 (2.7%)	2 (2.9%)	4 (2.3%)	3 (2.1%)	0 (0%)
Total migration times (years), (<i>M, SD</i>)	4.06 (2.60)	4.33 (2.76)	4.76 (2.96)	4.47 (2.83)	4.44 (2.82)	3.36 (2.27)	4.5 (2.96)	4.16 (2.45)	4.56 (3.04)	4.57 (2.81)	4.36 (2.77)	4.14 (2.49)
No. of cities stayed, (<i>M, SD</i>)	1.95 (1.09)	1.79 (0.93)	1.96 (1.05)	1.84 (1.05)	1.85 (0.83)	2.47 (1.51)	1.83 (1.06)	1.88 (0.96)	1.94 (0.99)	1.90 (1.05)	1.77 (0.89)	2.35 (1.30)
Time in Beijing (years), (<i>M, SD</i>)	2.85 (1.96)	2.99 (2.19)	3.24 (2.27)	3.08 (2.23)	3.11 (2.13)	2.92 (1.17)	3.05 (2.22)	2.86 (2.03)	3.28 (2.25)	3.15 (2.35)	3.02 (2.15)	2.38 (1.60)
Monthly income (yuan),(<i>M, SD</i>)	4385.5 (2397.1)	4352.3 (2353.1)	4827.6 (1984.4)	4012.6 (2062.1)	5431.9 (2533.5)	3742.9 (1278)	4315.7 (2447.1)	4352.8 (2174.5)	4990.9 (2161.1)	4282.3 (2217.8)	4701.4 (2491.9)	4590.5 (1562.7)
Han ethnic	73 (89%)	177 (93.7%)	74 (92.5%)	187 (89.9%)	107 (95.5%)	15 (100%)	121 (91%)	137 (94.5%)	63 (90%)	153 (90.5%)	137 (94.5%)	21 (91.3%)
Hometown type												
City	13 (16.3%)	37 (20.3%)	8 (10.3%)	33 (16.6%)	20 (17.9%)	3 (23.1%)	23 (17.6%)	27 (19.6%)	7 (10.3%)	27 (16.8%)	26 (18.2%)	4 (18.2%)
County	21 (26.3%)	23 (12.6%)	19 (24.4%)	37 (18.6%)	22 (19.6%)	3 (23.1%)	24 (18.3%)	24 (17.4%)	14 (20.6%)	37 (23%)	19 (13.3%)	5 (22.7%)
Township	14 (17.5%)	46 (25.3%)	22 (28.2%)	47 (23.6%)	30 (26.8%)	3 (23.1%)	32 (24.4%)	31 (22.55)	19 (27.9%)	32 (19.9%)	43 (30.1%)	6 (27.3%)
Rural	32 (40%)	76 (41.8%)	29 (37.2%)	82 (41.2%)	40 (35.7%)	4 (30.8%)	52 (39.7%)	56 (40.6%)	28 (41.2%)	65 (40.4%)	55 (38.5%)	7 (31.8%)
Education (years),(<i>M, SD</i>)	9.17 (2.29)	9.4 (2.27)	9.4 (2.19)	9.4 (2.33)	9.32 (2.08)	9.40 (2.56)	9.27 (2.41)	9.32 (2.14)	9.38 (2.25)	9.4 (2.42)	9.33 (2.27)	9.00 (2.65)
Marriage status												
Single	38 (46.9%)	98 (51.3%)	52 (66.7%)	105 (50.7%)	65 (57%)	11 (73.3%)	69 (50.7%)	70 (49.3%)	46 (66.7%)	96 (57.1%)	71 (48.3%)	17 (73.9%)
Single but living with a partner	10 (12.3%)	19 (9.9%)	8 (10.3%)	20 (9.7%)	16 (14%)	0 (0%)	11 (8.1%)	19 (13.4%)	6 (8.7%)	13 (7.7%)	20 (13.6%)	3 (13%)
Married	25 (30.9%)	58 (30.4%)	11 (14.1%)	63 (30.4%)	25 (21.9%)	3 (20%)	38 (27.9%)	47 (33.1%)	11 (15.9%)	46 (27.4%)	42 (28.6%)	2 (8.7%)
Divorced, widowed, or separated	8 (9.9%)	16 (8.4%)	7 (9%)	19 (9.2%)	8 (7%)	1 (6.7%)	18 (13.2%)	6 (4.2%)	6 (8.7%)	13 (7.7%)	14 (9.5%)	1 (4.3%)

1 = did not see or hear any; 2 = yes, but not much impression; 3 = yes, lasting impression.

Table 3.

Media exposure of HIV/AIDS prevention information and condom-/HIV-related variables

	TV						Radio						Street ads						Internet					
				Post hoc						Post hoc						Post hoc						Post hoc		
	1	2	3	1 < 2	1 < 3	2 < 3	1	2	3	1 < 2	1 < 3	2 < 3	1	2	3	1 < 2	1 < 3	2 < 3	1	2	3	1 < 2	1 < 3	2 < 3
HIV knowledge	13.86 (3.53)	14.38 (2.71)	14.93 (3.01)				14.13 (3.17)	14.82 (2.27)	15.2 (3.32)				13.85 (3.12)	14.66 (2.90)	14.74 (2.88)*				3.17 (.24)	2.54 (.21)	2.63 (.55)***			**
Condom attitudes	1.42 (.28)	1.39 (.28)	1.36 (.26)				1.36 (.27)	1.45 (.29)	1.31 (.24)**	*			1.34 (.26)	1.44 (.29)	1.41 (.28)*	*			1.37 (.26)	1.42 (.30)	1.34 (.28)			
Condom self-efficacy	2.71 (.52)	2.86 (.39)	2.95 (.55)**	*	**		2.82 (.46)	2.83 (.43)	3.06 (.70)				2.84 (.42)	2.79 (.49)	2.96 (.47)*		*		2.81 (.47)	2.83 (.41)	3.13 (.65)**	**	*	
Condom use with regular partners	2.94 (1.32)	3.07 (1.43)	3.57 (1.27)**		*	*	3.04 (1.39)	3.39 (1.37)	3.53 (1.25) (p = .06)				2.99 (1.42)	3.15 (1.40)	3.53 (1.27)*		*		2.93 (1.42)	3.37 (1.32)	3.83 (1.27)***	*	*	
Condom use with casual partners	3.58 (1.02)	3.64 (1.21)	3.71 (1.14)				3.59 (1.26)	3.66 (0.89)	4.08 (1.08)				3.68 (1.21)	3.55 (1.12)	3.75 (1.01)				3.65 (1.16)	3.57 (1.09)	4.38 (.89)	*	*	*
Last three episodes with regular partner	2.53 (1.25)	2.63 (1.28)	2.9 (1.06)				2.54 (1.25)	2.92 (1.15)	2.67 (1.30)*	*			2.54 (1.29)	2.75 (1.20)	2.77 (1.16)				2.43 (1.27)	2.91 (1.16)	3.19 (.98)***	**	*	
Last three episodes with casual partner	3.06 (1.07)	3.06 (1.11)	3.04 (1.03)				3.00 (1.14)	3.18 (0.96)	2.92 (1.24)				3.16 (1.08)	2.98 (1.09)	3.03 (1.04)				3.13 (1.13)	2.98 (1.03)	3.31 (1.01)			
How much do you know about AIDS?	2.35 (.72)	2.38 (.69)	2.33 (.99)				2.38 (.75)	2.27 (.81)	2.93 (.80)**		*	**	2.39 (.67)	2.43 (.71)	2.16 (1.05)*		*		2.28 (.76)	2.39 (.78)	2.83 (.78)**	**	*	*
Likelihood of obtaining AIDS	1.59 (.61)	1.67 (.52)	1.47 (.57)*			*	1.61 (.57)	1.65 (.53)	1.53 (.52)				1.79 (.54)	1.51 (.55)	1.43 (.50)***	***	***		1.59 (.59)	1.68 (.51)	1.35 (.49)			*
Sexual communication	3.16 (.61)	3.17 (.53)	3.34 (.55) (p = .053)			p = .07	3.20 (.55)	3.13 (.50)	3.7 (.86)***	**	***		3.20 (.58)	3.10 (.53)	3.42 (.53)***	*	***	*	3.27 (.55)	3.08 (.51)	3.46 (.79)***	**		**

1 = did not see or hear any; 2 = yes, but not much impression; 3 = yes, lasting impression.