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Indigenous HIV Prevention Beliefs and Practices among Low-earning Chinese Sex Workers as Context for Introducing Female Condoms and Other Novel Prevention Options

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Abstract

New interventions to reduce HIV and sexually transmitted infections among female sex workers are introduced into the context of women's existing prevention beliefs and practices. These indigenous practices affected implementation of our program to introduce female condoms to women in sex work establishments in southern China. We used ethnographic field observations and in-depth interviews to document common prevention methods women reported using to protect themselves before and during intervention implementation. Individual, sex-work establishment, and other contextual factors, including sources of information and social and economic pressures to use or reject prevention options, shaped their perceptions and selection of these methods and affected adoption of female condoms as an additional tool. Efforts to improve uptake of effective prevention methods among low-income sex workers requires attention to the context and spectrum of women's HIV/STI prevention practices when introducing innovations like female condoms, microbicides, pre-exposure prophylaxis pills, and others, as they become available.

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Keywords

HIV/STI; prevention; China; female sex workers; female condoms; heterosexual transmission

INTRODUCTION

Heterosexual transmission has surpassed injection drug use as a primary mode of HIV transmission in China, and the nation's booming sex industry plays a significant role in new infections each year (Rou et al., 2007; B. Wang et al., 2007). An estimated 10 million female sex workers are currently operating in China (Hong, Poon, & Zhang, 2011). The high mobility of China's female sex workers and their clients has fueled the spread of HIV throughout the nation (Hesketh, Zhang, & Qiang, 2005; Hu, Liu, Li, Stanton, & Chen, 2006), with prevalence estimates among female sex workers ranging from 0.54% in a study of six southern Chinese cities (X. S. Chen et al., 2012) to greater than 10% in endemic areas of Yunnan Province (Xu et al., 2008). A surge in sexually transmitted infections (STI) has also accompanied the growth of China's HIV epidemic, with one million new cases reported annually (X. S. Chen et al., 2006; Hong et al., 2011).

Over the past two decades there have been many efforts to curb the spread of HIV/STI in China through outreach and education in sex service establishments, including provision of testing, treatment, and prevention resources such as free male condoms (MC) to reduce unprotected sex (Hong et al., 2011). These efforts have been effective; studies show general prevention knowledge and MC use among Chinese female sex workers have steadily improved over that period (Z. Chen et al., 2008; B. Wang et al., 2007). But even in regions targeted by these efforts, unprotected sex between women and their clients continues. This is demonstrated through self-reporting of condom use and high syphilis infection rates (Z. Chen et al., 2008; Han et al., 2009; Tucker et al., 2010; H. Wang et al., 2009), particularly among low-earning sex workers largely associated with economic pressures that limit their power to negotiate safer sex (Archibald, Chan, Wong, Goh, & Goh, 1994; S. Y. Choi & Holroyd, 2007; H. Wang et al., 2012). Many researchers have pointed to the need to build sex workers' self-efficacy to engage in prevention practices, thereby empowering them to use more effective prevention options (Yang & Xia, 2006). Others identify disconnects between HIV/STI risk understanding, condom knowledge, and condom use (Rou et al., 2007). But these studies have produced limited explanation of why these disconnects exist, beyond recognizing client reluctance to use MC as a contributing factor (Han et al., 2009).

Many intervention programs to date have not sufficiently recognized the complex factors that influence female sex workers' risk perceptions and prevention behaviors. MC and more recent clinically tested novel prevention options, like female condoms (FC) (Beksinska, Smit, Joanis, Usher-Patel, & Potter, 2011; Schwartz et al., 2008; Vijayakumar, Mabude, Smit, Beksinska, & Lurie, 2006), pre-exposure prophylaxis (PrEP) (Aaron & Cohan, 2013; Abbas, Anderson, & Mellors, 2007), and other innovations (Baum et al., 2012; Rosenberg & Devlin, 2012), are not introduced into a vacuum, but enter women's existing prevention beliefs and practices (Hou, Qiu, Zhao, Zeng, & Cheng, 2010). Women's confidence in and reliance on their own alternative methods, most of which are ineffective or significantly less

effective than barrier methods, undermine intervention messages that stress the importance of consistent condom use to prevent both HIV and STI (McKee, Baquero, Anderson, Alvarez, & Karasz, 2009). More research is needed to understand the many prevention strategies female sex workers consider useful, their sources of information and influence about those strategies, decision-making processes regarding their use, factors affecting women's power and options to select effective methods, and how the introduction of new prevention options might contradict or compliment female sex workers' existing health views and behaviors.

This article focuses on these issues as we examined them in the context of a study (2007–2012) to introduce the FC as a novel prevention option to women in southern China who worked in establishments where they exchanged sex for money. A significant component of this study used ethnographic methods, including field observations and in-depth interviews, to examine intervention implementation contexts, processes, and outcomes. In this article we discuss common prevention methods study participants described using to protect themselves prior to and during intervention implementation, as documented in our extensive ethnographic data. We outline the individual, sex-work establishment, and other contextual factors that shaped their perceptions of and selections among these methods, and how those factors may have affected their interest in adopting FC as an additional HIV/STI prevention tool.

METHODS

Project Overview and Data Collection Methods

The China/U.S. Women's Health Project was a partnership between U.S. and Chinese researchers, the Hainan and Guangxi Provincial Centers for Disease Control and Prevention (CDC), and local healthcare and public health organizations (Liao, Weeks, Wang, Nie, et al., 2011; Liao, Weeks, Wang, Li, et al., 2011; Weeks et al., 2010). This team implemented and tested a multilevel intervention that engaged local healthcare providers to deliver a skills-based intervention to women working in sex-work establishments in small and mid-sized towns selected by our CDC partners because of their significant sex industry and high STI incidence. The intervention, described more fully elsewhere (Liao, Weeks, Wang, Nie, et al., 2011; Weeks et al., 2010), was designed to introduce women to the FC and build their self-efficacy to use it. The intervention also garnered peer and boss support to build group norms within establishments and across women's sex-working peer networks within the towns to increase FC adoption. Local health providers delivered intensive intervention for six months to reach all establishments in the study districts, followed by six additional months of intervention maintenance. Their approach was to educate female sex workers on women's reproductive health in general and to promote and explain proper use of evidence-based prevention methods, including MC and FC. They also dispelled misinformation about HIV and discouraged reliance on ineffective popular prevention practices.

Our international research team spent eighteen months sequentially in each study site to complete formative and intervention research, during which two project ethnographers (one from the U.S. [Jennifer Dunn] and one from Beijing [Qingning Zhang following Fei Li]) spent substantial time living and collecting data in the study communities. During the 4–6

month formative period in each site prior to any intervention delivery, ethnographers observed and mapped the local sex-work establishments using hand-drawn diagrams to indicate the number and placement of establishments, using code names to protect location identities. With assistance from local public health staff, they approached all establishments within the town selected for study and sought permission from bosses (where present) or women to participate in the research (including site observations, formal or informal interviews, and surveys) and to receive the site-based intervention. Refusals included less than 10% of establishments in the study districts and fewer than 20% of women working in them. Ethnographers also documented health and other local resources, economic patterns such as seasonal markets and factors affecting migrating labor (the clientele of many female sex workers), and police practices in relation to sex work establishments.

In-depth interviews were conducted with sex workers, establishment bosses, and local health providers prior to and after intervention delivery in each city. Data used for this article include formal in-depth interviews and informal conversations conducted with the women working in the establishments. Women received a modest non-cash gift incentive (e.g., small silk purse, toiletries, etc., value 80–100 Yuan [approximately \$10–12 US]) for a 1-hour in-depth interview, but no incentives were provided for informal interviews and site observations. Ethnographers wrote extensive notes during and immediately after the interview, documenting quotes verbatim whenever possible; no interviews were audio-recorded and code numbers were used instead of names. Ethnographers used informal interviews and establishment observations to build women's trust while remaining mindful of their time and business needs, which increased women's participation in formal in-depth interviews. Observations also provided information on the establishment setting and economic and police pressures in the district.

During the period of intervention implementation, ethnographers observed social dynamics inside the establishments, intervention delivery in these settings, and changes at the town level throughout the year, maintaining weekly observational notes. They also continued to interview women formally and informally on their prevention beliefs and practices, including regarding the newly introduced FC. Behavioral outcomes and attitude changes before and after intervention delivery were also measured by three cross-sectional surveys (baseline, 6-month, 12-month). Survey findings (reported elsewhere (Liao, Weeks, Wang, Nie, et al., 2011; Liao, Weeks, Wang, Li, et al., 2011; Nie et al., 2013; Y. Wang et al., 2013)), indicated that over 80% of the women interviewed post-intervention reported knowing about FC, and between 29%-37% had use it at least once, despite never having been exposed to it before (Nie et al., 2013).

All interview, intervention, and other project protocols were reviewed and approved by Institutional Review Boards at the Institute for Community Research in the U.S. and at Peking Union Medical College and the Guangxi Provincial CDC in China. During observations, ethnographers introduced themselves to everyone present as conducting health research and verbally consented them. Interviewees were asked to provide written informed consent before initiating an interview.

Qualitative Sample, Data Processing, and Analytical Procedures

This article focuses on establishments that offered lowest-priced sex services in each city, which included roadside brothels and boarding houses in three urban districts that our provincial CDC partners identified as having a large sex industry and high incidence of STIs. These include PSL district in PX city, Guangxi Province, and JCY and HSJ districts in QH city, Hainan Province. Consistent with other studies (S. Y. Choi & Holroyd, 2007), women in these low-economic settings reported less consistent MC use and more reliance on other, less effective prevention methods than women in PX and QH cities' higher-end establishments. Over half of the study participants from these three districts reported occasional or regular unprotected sex with clients (Nie et al., 2013).

Data analyzed for this article include interviews with 84 women, including 17 from PSL (20.2%), 29 from HSJ (34.5%), and 38 from JCY (45.2%), who participated in at least one formal in-depth interview (total N=72) and/or with whom we had repeated, documented conversations throughout our field observations (N=12 informally interviewed only). In recruiting women for interviews, we used maximum variation sampling (Draucker, Martsolf, Ross, & Rusk, 2007; Patton, 2005) by keeping track of their demographic characteristics to generate a sample that reflected the range of variation in the target population. Distribution of these women by age group and type of sex-work establishment is included in Table 1. We also sought women reflecting variation in reproductive history and time and experience in the sex industry. The majority of these women were interviewed pre-intervention (N=61), some of whom were followed throughout the intervention period, and the rest (N=23) were only interviewed post-intervention. Repeated observations were conducted during different times of the day, as well as throughout seasonal events that contributed to fluctuations in sex worker and client populations (e.g., regional markets, harvests, construction projects).

Ethnographers used a semi-structured interview guide to explore information about the local sex industry, women's personal histories and sex-work experiences, perceptions of HIV/STI risks, their own and popular prevention knowledge and practices, establishment dynamics, social ties, and availability and use of local health resources. After intervention delivery, we also explored women's responses to intervention sessions and the FC. Some ethnographic interviews and field observation notes were written in Chinese and others in English. Chinese field notes and interview transcripts were translated into English but coded together with the original Chinese text. Our bilingual ethnographers identified common slang terms and agreed on corresponding translation terms for use by translation services. Translations were reviewed for accuracy.

Data were coded for key themes derived from our theoretical examination of multilevel factors affecting HIV risk and prevention in the context of establishment-based sex work and introduction of a new prevention option (FC). Study investigators and ethnographers developed a code list of key analytical constructs (e.g., site life, reproductive health, FC use/negotiation, migration patterns, etc.) for coding and analysis of text data using Atlas-ti (Muhr, 1999). The code list was continuously discussed for definition clarification and relevance in reflecting emerging themes and trends. Ethnographers periodically coded the same documents independently, compared them for consistency in application of codes and

resulting output, and discussed differences until reaching consensus on coding procedures and code definitions.

We analyzed data by seeking patterns in documented events and actions, such as acts of protected or unprotected sex in specific contexts, prevention attempts (including use of effective and ineffective methods), negotiations with or refusal of a client, and reported infection. We further analyzed these events by factors affecting women's decision-making processes, their personal power and agency, and their prevention options. Such factors included women's health knowledge, beliefs and risk perceptions, financial and police pressures, peer influences, life priorities, client relationships, availability of prevention tools, and intervention exposure. This examination revealed women's efforts to practice a hierarchy of more effective to less effective prevention options. During our 18-month presence in each town, we documented changes in many women's prevention attitudes and practices over time. The longitudinal tracking of individual, social, and environmental dynamics as women encountered new life challenges or moved between establishments facilitated our understanding of how changing environments and circumstances shaped their prevention actions.

FINDINGS

Study Settings: Observed Sex Industry in the Three Low-income Urban Districts

PSL is a narrow street centrally located in PX city, Guangxi Province, where five motels and boarding houses were concentrated among other small local business. Sex workers lived and received clients in private rooms they rented in these establishments. Proprietors (i.e., managers or landlords) openly acknowledged commercial sex operations in their establishments, but had no direct role in managing sex services. The majority of women in PSL ranged in age from 35–55, and charged an average of 30 Yuan (about \$4.50) per sex act. Many PSL women also had regular clients, who provided steady business and occasional additional financial support. Police raids were rare in this city.

HSJ is a narrow street that intersects with a busy vegetable market in a heavily trafficked section of QH city, Hainan Province. HSJ sex-service establishments had signs advertising them as massage and hair parlors, though only two of seven parlors we observed provided any services besides sex. HSJ establishment bosses were always present and actively managed commercial sex in their businesses. Clients paid 30–80 Yuan per sex act in HSJ, of which bosses received 10 Yuan. Some bosses promoted or helped negotiate MC use in their establishments; others encouraged women to engage in unprotected sex, particularly when business was slow. Women working in HSJ typically ranged from 16–29 years old, though two establishments included women in their 30s.

JCY is a special district in QH city in which a series of single-storied adjacent buildings were erected to house migrant laborers in the 1980s–1990s. These long, narrow, buildings offered a series of individual single rooms for rent, each with its own entrance. During our study, the vast majority of these rooms was being rented monthly to women, who used them during the day to engage in sex work. JCY was locally regarded as a risky section of the city, where at least two recent murders had occurred. Sex workers in JCY were vulnerable to

violence, theft, frequent police raids, and arrest. Prices for sex in JCY ranged from 20–60 Yuan, but averaged about 20 Yuan for women age 30 or older and 30 Yuan for younger women. JCY landlords limited their interactions with tenants to monthly rent collections (about 200 Yuan or \$31 per month). Nearly all women who conducted business in HSJ or JCY maintained a separate residence elsewhere in the city where they slept.

Methods Women Consider and Use to Prevent HIV/STI and Protect Reproductive Health

Nearly all women working in districts HSJ, JCY, and PSL ranked condoms as the most effective HIV/STI prevention option available to them. However, they also reported using several supplements to or substitutes for condoms, some of which are common among other at-risk populations, such as douching (Martino, Youngpairoj, & Vermund, 2004; McKee et al., 2009) and some of which may be unique to Chinese women, such as traditional Chinese medicines (Weeks et al., 2007; Xia & Yang, 2005). The most common prevention methods our study participants reported using in addition to or as replacements for condoms included the following:

- Douching and washing themselves after sex and their clients before sex: Products they washed with included feminine hygiene products, soap, water, alcohol, antibiotics, and other medicinal creams. Women often referred to douching products as “medicine water,” or as a means to “sterilize” their own or their clients’ genitals. These products could readily be purchased in pharmacies or stores. Feminine hygiene douching products do not appear to have modern medicinal ingredients, though many do have traditional Chinese medicinal contents.
- Assessing clients: Women reported assessing a client as high- or low-risk based on their perception of the population he was from (migrant or local, age and ethnicity), his social status (economic class, profession, marital status), apparent signs of drug use, and other factors, including whether he was a regular or one-time client. Different women formed different conclusions about the level of health risks a man presented based on these initial assessments. For example, some claimed migrant laborers were lowest risk; other women said elderly farmers were lowest risk. Women frequently stated that foreigners and other men that appeared ethnically different were highest risk. Almost all viewed general poor hygiene (dirty hair, clothes, underwear) as a reason to either turn a client away or use extra prevention measures before or after sex with him. Women also checked clients’ genitals for visible physical signs of infection (such as puss or sores) before having sex with them. Women nearly always treated regular clients, and those they believed were exclusive to themselves, differently from one-time clients, and had much lower condom use with the former.
- Use of oral and injected antibiotics as preventative and early treatment methods: Antibiotics are available throughout China without prescription in pharmacies and private health clinics, and are routinely offered in public clinics and hospitals. Nearly all women reported going to private clinics for antibiotic infusions directly after menstruation as a routine disease prevention strategy, or seeking antibiotics in response to general abdominal or vaginal discomfort,

adverse symptoms (like irritation or discharge), or perceived exposure to risk. Some women used antibiotic suppositories they inserted vaginally before sleeping.

- Avoidance of sex near their menstrual cycle: Nearly all women refused clients or did not go to work when they believe their bodies to be more vulnerable to infection, such as during and right after menstruation or when suffering from any other general physical ailment.
- Traditional Chinese medicines: These include suppositories, washes and douches, drinks, or topical solutions made of or advertised as traditional Chinese medicines. The herbal content, effects, and efficacy of these medicines are generally unknown. Many of these products' packages include claims of efficacy in preventing HIV and STI. Women also integrated traditional Chinese medicines philosophies into their prevention routines, such as consumption of foods with properties believed to cleanse their bodies or elevate natural immunity (Weeks et al., 2007).

Female Sex Workers' HIV/STI Risk Assessment and Prevention

Analysis of our data revealed several recurrent factors that influenced women's condom use with paying partners and use of other methods perceived as prevention. These factors included:

1. Risk, health, and prevention knowledge (i.e., knowledge of infections and understanding of how to avoid or minimize risk);
2. Life stage and priorities (e.g., motivation to protect personal reproductive health or to provide for existing children);
3. Client demands to use or not use condoms and negotiation power with different kinds of clients (elderly versus young, regular versus unfamiliar);
4. Economic opportunities and pressures (e.g., competition from other women, life expenses, threats of police raids);
5. Peer influences and sex work establishment prevention norms.

The following case examples illustrate how these factors combined and played out in women's HIV/STI prevention efforts.

Sources of Information and Peer Influence on Female Sex Workers' Health Knowledge, HIV/STI Risk Perceptions, and Prevention Methods—

Nearly all women we interviewed during the formative period reported having little to no HIV/STI prevention awareness or knowledge before entering the sex industry, even if they had previously been sexually active with boyfriends or husbands and had knowledge of contraception. They became active in their search for disease prevention information and strategies after joining the industry as they gained awareness of or personal experience with STI. All women cited "sisters" (i.e., peers and coworkers) as key health advisors. For each woman, a particularly important advisor was the woman who brought her into the sex

industry, if that occurred; this person usually provided the woman her first basic prevention and work information. Subsequently she relied on familiar women who had been working in the industry longer than she had. These experienced peers instructed newer women about health risks related to their new profession and recommended routine prevention and treatment measures. Women also sought information from boyfriends or other primary sex partners, product advertisements, health care providers, pharmacists, establishment bosses, books, and the Internet. They pieced information together from these different sources and incorporated their own insights and experiences, creating a package of strategies from which they drew to achieve maximum prevention effect, as evident in the following quote:

We never thought about this stuff back home before. We didn't think about things like bacteria, what was dirty, what was hygienic, because no one told us about that. We didn't wash ourselves (genitals) every day, only just before sex. I know my mom didn't wash daily, but she didn't speak about it with me. I learned many new hygiene methods after I started (sex) work because the other sisters told me; other women who had been doing this work longer and had more experience. Doing this work, we have to pay close attention to preventing infections. We all discuss these methods together, because health is important to all of us. Now I have more experience and I understand more. (Xiao Wu [all names are pseudonyms], age 45, from Hunan Province, working in JCY.)

Xiao Wu spent most of her life in her rural home region, where she had limited access to healthcare and information. She described her home as "traditional," and explained that topics relating to sexual health were not openly discussed. This was the case with many middle-aged women from rural, impoverished areas, where sexual discussion and activity is still restricted by traditional values. But even younger women, who on average had more years of schooling and engaged in more pre-marital sexual activity than older generations, often were not exposed even to basic HIV/STI information that could help prepare them for the health risks of sex work. Xiao Fei exemplified this point:

When I first started doing this (sex) work, I didn't know it was dangerous not to use condoms. I didn't even really know about condoms at all. So for a long time, I wasn't using condoms with the men. Then I was hearing sisters talk sometimes about how it is better to use condoms, and I heard some things about HIV around, on some posters and from your project people. After that I asked my boyfriend, 'Is it true that you should really use condoms, not do it with clients without condoms?' and he said, 'Right.' I was so mad; I thought 'Why didn't you tell me that sooner!' (26, from Jiangsu, worked in both JCY and HSJ)

Xiao Fei's lack of HIV/STI risk and prevention knowledge was particularly notable given her advanced level of education (two years of vocational training post-high school) relative to most women who participated in our study. She had not discussed STI prevention with her boyfriend, with whom she had been sexually active and who had persuaded her to join the sex industry, until she questioned him about it a year after initiating sex work.

Nearly all women we interviewed explained that they sought and received information from a variety of sources after joining the sex industry. However, many sources available to them

provided misleading or scientifically inaccurate advice, as illustrated by Xiao Ai, a 49-year-old woman working in JCY, who reported using MC with less than half of her clients.

XA: Doing this work, we have to protect ourselves, we have to be careful and have to sanitize (*qingjie*) after business, at home and at night. I have been doing this work so many years already, and I never had any problems because I am so careful. I really pay attention to washing and sanitizing. I wash with *Fuyanjie* (feminine hygiene douching product) every time after every client and also at home at night. I also have a special capsule; it is a medicine that I insert in my vagina, to sterilize. You can buy it at the pharmacy.

Eth: Where did you hear it can sterilize and prevent infection?

XA: From TV. There are advertisements about it. They say women should use this to be clean and sanitary, that we should *qingjie* (sanitize), to be healthy. The washing, these capsules, and antibiotic pills, they are the same—they are prevention. I don't use those things because I have an infection; I never have a problem. I use them to PREVENT myself from getting an infection.

Her faith in the ability of capsules, creams, douches and antibiotics to prevent infections, even in the absence of condom use, is shared by many women working in these low-income settings. These beliefs were promoted by product advertising, supported by the testimony of sisters, and further encouraged by practices of trusted private clinicians, who prescribed these methods as prevention without performing diagnostic exams. 45-year-old Xiao Wu (from Hunan, working in JCY) also articulated this:

XW: Another (STI prevention) method I use is after my period I always go for an antibiotic drip. If I don't get that, then I might get sick.

Eth: So, is it to stop you from getting sick, or to treat a problem you might already have, or an infection they test for?

XW: No, no, they don't do any test. We don't go to one of those public hospitals, just the private clinics. I just have to say something like, 'I'm worried about getting some infection down there; I want to prevent illness.' They kind of suspect (our work and concerns), when you say it like that.

The majority of female sex workers, clients, and community members we interviewed cited private clinicians and pharmacy staff as reliable health experts, though the information they provided was not always accurate (Reynolds & McKee, 2011). Staff in these settings routinely provided antibiotics on patients' request, without performing an exam or testing to determine whether or which antibiotics would be appropriate treatment. This practice is common partly because many private clinics in these regions lack on-site testing facilities. In spite of these limitations, about half of the sex workers we interviewed said they preferred seeking treatment in private clinics, citing lower costs and greater anonymity as advantages to public hospitals. The multitude of private clinics located near PSL, HSJ, and JCY also made them convenient health centers for sex workers operating in those districts.

Life Stage, Establishment Norms, and Economic Contexts Affecting Women's HIV/STI Prevention Negotiations and Actions—Other factors influencing women's

decisions regarding condom use included their reproductive history and health concerns, personal and family financial obligations, long-term life and career objectives, condom use norms in their establishment, boss or gatekeeper input, client relationships and demands, and regional economic and development trends. After weighing perceived health risks against these factors, if a woman agreed to unprotected sex with a client, she attempted to mitigate those risks through application of alternative prevention methods.

For example, 25 year-old Ai Li, from a rural village in Hunan, had been working in HSJ and the sex industry about two months. Her husband worked low-wage construction in Guangzhou. She lived locally with her children aged 2 and 4, and came to the establishment only a few hours each day, when a neighbor was available to watch the children. Her only previous exposure to reproductive health information was from her home village women's health leader, an official whose role was confined to enforcing family planning laws. Ai Li said she once heard something about HIV on TV, but was not clear what it was or how it was transmitted.

Ai: I think it is better to use MC with clients but sometimes I don't. Like the other day there was one guy, we didn't use one. I didn't have a client yet all day, I had to get some business! He would only do it without a MC. So I agreed, I didn't have a choice; I had to earn some money. But there are some other things you can do, like tell him to ejaculate outside your body.

Ai Li acknowledged that clients rarely complied with her requests to withdrawal before ejaculating. However, she also expressed feeling pressured to maximize her earning potential in the limited hours she had to work each day.

Peer trends and other establishment dynamics also influenced individual condom use rates. Li Jing (38, from Hunan) reported using condoms only about 65% of the time in JCY, where she explained pressure to engage in unprotected sex was high.

Sometimes, there is no choice about using condoms. Some of the men refuse to use condoms. ...If you never accept sex without a condom, you won't have any business. There are lots of young women here. Sometimes the client will offer to pay more money for no condom, and people agree more (to unprotected sex) in that situation.

Stiff competition from other women working in JCY—younger, more attractive women, and older women who didn't routinely insist on condom use—was a significant consideration in Li Jing's condom negotiations. She relied on several alternative methods to protect her health.

I try to tell the men to use a condom, but if he is reluctant I check his penis to see if it is red; if it isn't red that means he doesn't have any problem (infections) and no condom is OK. During my period I always get antibiotic infusions to prevent diseases, and I take two pills of No.2 cephalothin (an over-the-counter antibiotic) daily. Men who have sex with me are nice; some of them are contractors. They are quality people. They come often and get to know me.

Li Jing explained that her routine use of antibiotics, in addition to her perceived ability to determine clients' health through visual examination and personality assessment, diminished potential risks of unprotected sex. She protected her earning potential by agreeing to client demands, but did so with confidence that her additional prevention methods were adequate replacements for condom use.

Thirty-eight-year-old A' Xia, from Chongqing, had been working in JCY for two years. She also relied heavily on general client assessment as a health precaution. She estimated 20% of her sexual encounters were unprotected, but she perceived these clients (low-earning migrant construction laborers) as low-risk.

We don't see (people with) infections here (JCY). The men who come here are just those migrant laborers; they don't have problems because they are normal men. The clients in those high-class places like salons, those men have problems! They have money and go out often paying for sex and drugs. Drug users are risky. They have infections. Men who come here don't have money for drugs.

Other women in our study also agreed to unprotected sex, but reported more accurate understanding of related health risks. They also strove to minimize those risks through many other prevention routines, but ultimately prioritized other concerns—such as family financial pressures—above their personal health in their daily prevention decisions.

A case in point is Shi, a 45-year-old divorced mother of two from Hunan. Shi had been working in the PX sex industry for nearly a decade, and as a former peer educator appointed by the CDC had attended many health education sessions. She demonstrated detailed knowledge of HIV/STI, transmission modes and even local infection rates, but reported having unprotected sex with over 60% of her clients.

Eth: Can you try convincing clients to use MC? Or refuse them if they don't agree?

Shi: We can't really do anything; we are poor and need to earn their money.

Eth: Are you concerned some of those clients you don't use condoms with might be infected with HIV or STI?

Shi: Yes, very. But fear won't change anything, so it is pointless. There is no choice; we will still have sex with them. We have to do this to get by. It's for our daily survival and for the future of the next generations. So we just do what we have to do.

Shi participated in free annual blood exams. She understood that frequent douching can be harmful and only douched in response to particular adverse symptoms. She inserted a product advertised as an anti-pathogen capsule into her vagina when she was experiencing unusual discharge. She reported that business at her establishment and her own earnings had declined in recent years. She previously averaged 10 clients per day; when we interviewed her, she reported only having 4 or 5 each day. This trend intensified her reluctance to deter clients with discussions of prevention.

Fifty-six-year-old Pa, who worked in a neighboring PSL boarding house, also expressed this acceptance of risk.

I'm dying, almost 60 years old. The sun is setting. With some of the men (who refuse condoms), I wash (their genitals) first. I also see if they look infected. But if he doesn't want to use a condom, then we don't use one.

Many younger female sex workers, who had been exposed to reliable health information and highly valued their reproductive and general future health, also agreed to unprotected sex in some cases. Xue (19 years old from Hunan, working in Hainan) had been in the sex industry for four years. She was previously treated for syphilis, an experience that frightened her and drove her to aggressively seek out and apply health information. Despite her efforts and wide perception among her peers that she had advanced knowledge of prevention matters, multiple interviews revealed narrow but critical gaps in her understanding of HIV.

Xue: I know HIV can be transmitted through semen and blood.

Eth: Yet you don't wear condoms every time. Aren't you worried you might be infected?

Xue: I'm not afraid. The moment I feel a little bad I go for a blood test. The exams are very convenient and available these days. I go to the Chinese Medicine Hospital. They check all of my private parts, do an ultrasound, and sometimes other additional exams. I do this two or three times a year.

Xue's very specific misconceptions—that if she contracted HIV she would feel symptomatic, and that frequent blood testing could be a reliable substitute for consistent condom use—may have originated from her experience with syphilis. She explained how these understandings of HIV/STI transmission and symptoms, in addition to financial pressures, led her to engage in unprotected sex with some clients in circumstances she could clearly define.

Xue rotated working between JCY and HSJ, depending on changing levels of violence, arrest risk, and earning potential in each district. Xue typically earned 50 Yuan (about \$8 U.S.) per client for one sex act in HSJ and 30 Yuan (about \$5 U.S.) per client in JCY, but had a higher average number of clients (up to 17 per day) in JCY. She used condoms with every sex act in HSJ, where condom use norms among women and clients were higher than in JCY. In JCY she agreed to unprotected sex about one-quarter of the time. Her clients were mostly migrant laborers from other provinces, generally about 40 or 50 years old. When business was slow or a client offered substantially more money than usual (e.g., 100 Yuan, about \$16 U.S.), Xue sometimes agreed to sex without a condom. She detailed the very strict screening and washing routine she relied on to minimize her risk in these cases:

- checking the man's penis for signs of infection, and only proceeding with unprotected sex if she determined he was 'clean';
- evaluating if his foreskin was too long to sufficiently inspect his penis, and declining unprotected sex if she deemed it was;
- washing her vagina directly after unprotected sex with a douching product;
- asking the man to ejaculate outside her body, and washing immediately after sex with an additional traditional Chinese medicine if he did not comply; and

- trying to minimize risk of infecting her boyfriend by using a condom with him when she felt symptomatic.

The array of prevention options and selection processes sex workers use in efforts to protect themselves from infection presents a context into which the introduction of new, effective prevention devices or practices adds more complexity. This context of women's established practices may facilitate or impede adoption of the new approach. Our introduction of the FC into sex work establishments illustrated these complexities.

Responses to Introduction of the Female Condoms—At the time women in our study sites were introduced to FC, they had already thought extensively about health and had multi-faceted prevention routines in place. Participants expressed predominantly negative first impressions of FC, stating that it was “too big,” “too strange,” “ugly,” or appeared “overly complicated.” Most women who tried FC had some initial difficulty with insertion. These are typical barriers to FC adoption, as reported in our own and numerous other FC acceptability studies (K. H. Choi, Roberts, Gomez, & Grinstead, 1999; Gallo, Kilbourne-Brook, & Coffey, 2012; Weeks, Coman, Hilario, Li, & Abbott, 2013). Local staff addressed these concerns and women's FC use challenges through repeated individual and group intervention sessions conducted in each establishment. After receiving extensive FC instruction and support, our study participants accepted or rejected FC for many reasons. The responses we documented highlighted women's individual needs as well as the complex dynamics that shaped their prevention concepts and behaviors in these low-income settings.

The majority of women we interviewed post-intervention were initially apprehensive about how their clients would respond to the FC. Thirty-two-year-old Li, from Hunan, explained that even suggesting FC to her clients in JCY could interfere with her business in a number of ways.

“It's not convenient. When a client comes, if I use FC, I need more time to insert it. I won't insert it earlier... I am telling the truth, we face many challenges doing this work. If a client sees you use FC, he may guess you are sick, and then he won't have sex with you.”

Her concerns reflected JCY's challenging work conditions; frequent police raids, low prices for sex, and high competition pressured JCY women to recruit clients aggressively and limit the time spent with each one. However, Li had used FC multiple times with her husband during a recent trip home and said she intended to continue using it with him in the future.

Many participants shared Li's conclusion that FC was only appropriate to use with primary or regular sex partners. This same conclusion had different implications in PSL establishments, where many women had regular clients with whom they felt comfortable discussing and practicing FC use. Police raids along PSL were exceedingly rare, and the pace of business generally slower than in JCY. The relatively stable environments and relationships that characterized PSL sex work supported repeated efforts to try FC.

For example, 35-year-old A' Hua (from Guangxi, working in PSL) was initially only willing to try FC with her most familiar client. Despite repeated struggles with insertion and use, they tried it together multiple times before dismissing it as an undesirable option. She only

decided to try it again later with a different client who refused to use MC. This attempt was successful, and after continued use she identified several advantages to FC.

Before, if a man refused to use MC, I refused to have sex with him. Now when they refuse MC, I suggest FC; I still have an option to keep the business and be safe... safety is most important. I think FC is better and safer. MC can get too dry during sex, and then they break easily. And when the man is moving a lot (during sex) there can be pain and friction against your skin. The FC is wider so you avoid so much skin contact, rough friction and pain.

A' Hua shared her experiences with sisters in her establishment, which persuaded several women, including Xiao Yi (36, from Guangxi) to try it again months after her initial, failed trial.

At first FC wasn't so easy to use, but after I learned how, it got easier. A' Hua told me how to insert it. She showed me how, using an FC and her hand. I listened to what she said and tried how she told me, and after that I thought it was better. Now I feel I can use it. Just the other day we were sitting around and I said to the other sisters "this FC is a good product; it is safer than MC." They all agree.

"Sisters" frequently discussed FC experiences with each other, and in some cases helped each other troubleshoot complications in FC use. These peer discussions significantly impacted popular FC attitudes in each establishment. Women's FC attitudes also shifted with exposure to health information. During early intervention stages many women said they were not interested in the FC because their existing prevention routines sufficiently protected them. They reconsidered their need for an additional prevention method after gaining more information about the inefficacy of those routines. The following excerpt from field notes collected in JCY demonstrates this point:

Ming (28, from Hunan) always used MC when she worked in HSJ, but not in JCY because clients leave if she insists on MC and she can't afford to lose the business. She is very concerned about protecting her health, and currently relies on washing after unprotected sex and routine monthly antibiotic injections to prevent infection. She asked project staff if these methods were effective MC substitutions; when answered that they were not, she inquired about FC. She explained that she hadn't agreed to try FC before because she assumed men would dislike FC equally or more than MC. Staff explained that other women reported that some men liked and even preferred FC. She said, "what a wonderful thing that would be, if they would accept FC!" and said she wanted to try FC as soon as possible.

Like Ming, many study participants' motivation to try the FC depended on their perceived need for an additional prevention method as well as their concerns regarding possible client responses to this new product. Support from peers and from project staff were pivotal in helping women negotiate FC use with their clients and in overcoming early FC use complications. Still, as with MC, women considered FC for prevention in a context in which speed of the transaction and client approval sometimes took precedence and less effective alternatives were sometimes believed to be equivalent substitutes.

DISCUSSION

Our findings demonstrated that female sex workers who do not consistently use MC are nevertheless highly proactive about HIV/STI prevention. The women we interviewed thought continuously about how to protect their health. For every woman, factors influencing their use of MC and alternative methods constantly evolved. We observed women adjusting their prevention strategies as their risk awareness developed and as their access to and knowledge of prevention tools increased. Changes in personal life priorities, age, financial obligations, economic circumstances, and risk of arrest also impacted their prevention efforts and options to use effective methods. Individual MC use rates varied over time, as did women's integration of alternative prevention strategies as supplements to or replacements for MC. Our case examples demonstrated how multiple personal, social, economic, and environmental factors were simultaneously at play, reflecting women's need to balance many and sometimes contradictory considerations with each commercial sex transaction and prevention decision. These complex prevention efforts had direct implications for these women's adoption of the newly introduced FC.

Although condom use norms varied at different establishments, women in HSJ, JCY, and PSL all faced pressure from clients to engage in unprotected sex. They sought to balance health and business interests by agreeing to unprotected sex with select, screened clients, and adhering to routine antibiotic schedules to ward off infections. Many older women knowingly accepted risks of condomless sex because their top priority was to maximize their earning potential in the limited time they had left in the industry. Their children's welfare and life opportunities were of greater importance to them than their personal health. All women took efforts to minimize risks of violence or hassles from police raids during sex work transactions. Thus, social conditions created risk environments (Rhodes, Stimson, & Quirk, 1996) in which female sex workers sought to protect themselves and their children or reproductive futures in the face of multiple threats, not just HIV/STI.

Female sex workers in our study generally had low formal education and limited HIV/STI knowledge (Liao, Weeks, Wang, Nie, et al., 2011; Liao, Weeks, Wang, Li, et al., 2011). They reported seeking and receiving health information from a wide variety of sources. However, study participants revealed many gaps in knowledge of HIV/STI transmission modes and symptoms. Misconceptions about HIV/STI risks and use of prevention practices that have little or no efficacy stemmed from women's lack of comprehensive sex education prior to joining the sex industry, as well as from inaccurate advice they received from other sex workers and even from trusted healthcare workers. In these low-income sex work settings, women frequently discussed hygiene and sensations of cleanliness as signals of health and prevention success (Weeks et al., 2007). Pharmacists and private clinicians reinforced women's misconceptions regarding prevention efficacy of the douching products, antibiotics, and other commercial hygiene products they sold. Women felt secure in their careful execution of time-consuming and even expensive prevention routines, while inadvertently exposing themselves to a high level of risk leading to a radical disconnect between prevention effort and effect. Interventions to introduce new effective prevention practices, devices, and medications to female sex workers in these contexts will likely be more successful if women are also equipped to better evaluate prevention information

provided by the many sources around them, while increasing their self-efficacy and peer support to use more effective available options. Also, increased education about the dangers of inappropriate use of antibiotics could help to reduce overuse and misuse of these medicines (Hvistendahl, 2012; Reynolds & McKee, 2011).

Addressing female sex workers' common misconceptions and increasing their access to accurate health information and prevention tools are necessary but insufficient paths to curbing rates of unprotected commercial sex. Dozens of women we interviewed demonstrated accurate risk awareness, but their clients' persistent rejection of condoms pushed them into difficult decisions to protect either their health or their income. This finding reinforces the need to focus more prevention efforts on clients of female sex workers (Hong et al., 2011; Lanham et al., 2014; Lau et al., 2007; Witte et al., 2006).

Women we interviewed also sought to replicate prevention strategies commonly discussed or endorsed by "sisters" in their sex-work establishments. Harnessing the value of trained peer educators can help combat medically unsound practices and elevate establishment condom use norms (Hu et al., 2006; Latkin, Sherman, & Knowlton, 2003; Li, Weeks, Borgatti, Clair, & Dickson-Gomez, 2012; Weeks et al., 2009; Wu et al., 2002). However, as our case examples illustrate, even highly knowledgeable sex workers may continue to engage in unprotected sex because of the social and economic conditions in which they must work. Pressures of age, competition with other women for clients, risk of arrest, and fear of stigma leading to use of private clinics rather than the better quality public hospitals are conditions that undermine peer educators' capacity and options to model the most effective prevention practices.

The complex personal, social network, sex-work establishment, neighborhood, and community factors that shaped women's prevention options and efforts also complicate or compromise adoption of prevention innovations (Weeks, Li, et al., 2013). Introduction of novel effective prevention methods must include assessment of and response to these complex conditions. Our study and others demonstrate that female sex workers are more likely to reduce risky behavior if they have multiple effective prevention options from which to choose and are able to apply them within the situations that place them at risk (Abdool Karim, Humphries, & Stein, 2012; Beksinska, Smit, Joanis, & Potter, 2012; Mack et al., 2014; Sidibe et al., 2014; Warren & Philpott, 2003; Weeks et al., 2007). Each prevention approach, whether behavioral, biomedical, or a new device, may have limited or expansive potential to offer female sex workers greater opportunity to reduce risky sexual encounters.

This study has several limitations. First, the number of women interviewed and establishments observed is small, and may not be representative of other sex workers and other urban districts in China. Also, our focus in this article is on women working in the lower tier of the sex industry in these cities; women in higher paying establishments may have some of the same and some different prevention practices. We chose to focus on the lower-tier female sex workers because they reported significantly greater rates of unprotected sex than women in the higher paying establishments (S. Y. Choi & Holroyd, 2007; Liao, Weeks, Wang, Li, et al., 2011; Nie et al., 2013; Y. Wang et al., 2013), though we also found that many good FC users were from the lower-tier establishments. Second, all

data here are based on self-report, which may have been affected by social desirability, recall bias, or other bias related to selective omission of information. Likewise, data are limited by the ethnographers' inability to access some locations, particularly at specific times of the day, and some women in these establishments were reluctant to speak to a researcher. We attempted to minimize the effects of selection bias and social desirability or omission bias by having two ethnographers (one American and one Chinese) comparing observations and interviewing women in all study sites, by establishing long-term relationships to build trust with the women and establishment owners, by creating a non-judgmental and private space for conducting interviews, and by seeking the positive support of local public health officials to assure protection of research participants and data.

Findings from our in-depth study of female sex workers' prevention practices and responses to introduction of the FC can help increase the effectiveness of future HIV/STI health intervention programs targeting Chinese women in similar settings. Expanded understanding of female sex workers' current practices could help improve outcomes of interventions aimed at increasing condom use, as well as women's potential future use of such innovations as vaginal microbicides (Gengiah & Abdool Karim, 2012; Lin et al., 2014; Sidibe et al., 2014), pre-exposure prophylaxis (PrEP) pills (Aaron & Cohan, 2013; Katz, 2013; Mastro, Sista, & Abdool-Karim, 2014), and other prevention devices (Baum et al., 2012; Friend, 2012) as they become available (Y. Wang et al., 2008). Our research demonstrates that having a clear understanding of Chinese female sex workers' use of popular, routine, periodic, and folk prevention practices along with MC will improve implementation and increase adoption of any new prevention devices or medications to which women are introduced to mitigate the HIV and STI epidemics.

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Table 1

Characteristics of the Ethnographic Interview Sample (N=84)

Characteristics	PSL # (%)	HSJ # (%)	JCY # (%)	Total*
Study district *	17 (20.2)	29 (34.5)	38 (45.2)	84
Age group **				
< 30 years old	2 (11.8)	21 (72.4)	12 (31.6)	35 (41.7)
30+ years old	15 (88.2)	8 (27.6)	26 (68.4)	49 (58.3)
Establishment type **				
Boarding house	16 (94.1)	0	38 (100)	54 (64.3)
Roadside brothel	1 (5.9)	29 (100)	0	30 (35.7)

* Percentages are of the total interview sample.

** Percentages are of the district subsample.