

Opportunities for Woman-Initiated HIV Prevention Methods among Female Sex Workers in Southern China

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Rapid changes in China over the past two decades have led to significant problems associated with population migration and changing social attitudes, including a growing sex industry and concurrent increases in STIs and HIV. This article reports results of an exploratory study of microbicide acceptability and readiness and current HIV prevention efforts among female sex workers in two rural and one urban town in Hainan and Guangxi Provinces in southern China. The study focused on these women's knowledge and cultural understandings of options for protecting themselves from exposure to STIs and HIV, and the potential viability and acceptability of woman-initiated prevention methods. We report on ethnographic elicitation interviews conducted with women working within informal sex-work establishments (hotels, massage and beauty parlors, roadside restaurants, boarding houses). We discuss implications of these findings for further promotion of woman-initiated prevention methods such as microbicides and female condoms among female sex workers in China.

Introduction

China is facing the prospect of an AIDS epidemic of catastrophic proportion. Although the epidemic has been relatively slow to take hold in this giant country, it is now clearly established in all provinces and large municipalities and is rampant in several specific regions (UNAIDS/WHO, 2004; Zhang & Ma, 2002). These include many southern provinces and all the “free

economic zones,” or areas selected by the government for special economic development. The rapid surge in the epidemic is directly linked with China's economic, social, and political changes in recent decades.

Accompanying rapid national economic growth over the past 20 years, China has experienced important social problems associated with economic disparities, population migration, exposure to new ideas through the media, and changing social mores and values (Zhang, Li, Li, & Beck, 1999; Zhang, 2001). China's “floating population” is now estimated to be 120–140 million people living in places other than their official residency (McCarthy, 1999; Zhang & Ma, 2002). These are primarily young men and women, rural-to-urban migrants seeking economic opportunity. Economic need has created the impetus for many to look for employment in the rapidly changing and often unstable industries that spring up, collapse, and move from place to place around the country.

A notable transformation resulting from these social dynamics is in sexual attitudes and practices. Distance from home (and its associated social controls and

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relationships), length of time away, and liberalized sexual attitudes have increased the potential that many young migrants will engage in premarital and extramarital sex (Cohen, Ping, Fox, & Henderson, 2000; Gil, 1994; Liao, 1998; Liao et al., in press; Zhang & Ma, 2002). Likewise, among the problems newly regenerated by China's social changes is an increase in prostitution, which has occurred in rural as well as urban contexts. The sex industry has boomed with the fast economic and social changes since the early 1980s (Cohen et al., 2000; Gil, Wang, Anderson, Lin, & Wu, 1996; Hershatter, 1997; Liao, 1998; Liao, He et al., 2002; Liao, Schensul, & Wolffers, 2002; Zhang et al., 1999). Prostitution is illegal in China. However, many young women initially seeking factory work in towns and cities have willingly or in some cases unwillingly (Gil et al., 1996; Liao et al., 2002) taken it up, intending to return to their homes or move to other locations to marry after several years of earning higher income through sex work. The majority are rural women. Many seek money, while some also seek worldly experiences and sexual pleasure (Cohen et al., 2000; Gil et al., 1996; Lau, Tsui, Siah, & Zhang, 2002; Liao et al., 2002; Rogers, Ying, Xin, Fung, & Kaufman, 2002). Official reports indicate that Chinese public security detained over 580,000 sex workers between 1981 and 1991, but 104,000 in 1991 alone (Cohen et al., 2000; Morrison & Dernberger, 1989). These numbers underestimate women engaged in the sex industry, as many working in more protected settings (e.g., discos, hotels, beauty and massage parlors), rather than on the streets, are less likely to be picked up by police (Gil et al., 1996; Liao, Schensul et al., 2002).

The combination of economic, ideological, and social changes and associated problems has created tremendous opportunity for exposure to and spread of HIV and other sexually transmitted infections (STIs), particularly among those engaging in risky practices. This transformation has resulted in the rapidly increased incidence of STIs in China (Chen, Gong, Liang, & Zhang, 2000; Gil et al., 1996). Further, women most at risk may not be aware of their potential exposure to infection given the limited information currently available on these epidemic infections and how they are spread or prevented, though dissemination of this information has increased in recent years (Chinese Ministry of Health, 2002; McCarthy, 1999; UNAIDS/WHO, 2004; Wang, Jiang, Siegal, Falck, & Carlson, 2001).

Early intervention to interrupt the pending explosion of HIV and other STI epidemics, particularly in the highest risk areas of China, could have tremendous benefit at this critical time. In particular, innovative and multiple prevention options, including some that women can control, are needed immediately. Vaginal microbicides, currently in development (Hardy, de Padua, Jimenez, & Zaneveld, 1998; Harrison, Rosenberg, & Bowcut, 2003; McCormack, 2002; Stone, 2002), and

female condoms (Feldblum, 2001; Gollub, 2000; Hoffman, Mantell, Exner, & Stein, 2004; Latka, 2001) are important prevention methods that might be central to stemming the pending flood of new infections through risky sex. Greater knowledge of the acceptability and feasibility of using these methods for high-risk women is a priority for AIDS prevention research, particularly in China's shifting social context.

We conducted a study (2003–2006) of microbicide acceptability among women working in the sex industry in three towns in southern China. Little is known about the population of female sex workers in these areas of China. Thus, the study was designed utilizing exploratory methods to begin to examine the social context, cultural meanings, and personal experiences of HIV/STI risk and prevention, and how these factors may potentially affect acceptability of vaginal microbicides and the female condom among these women. At present, neither prevention method is available for use in these study sites; microbicides are still in clinical trials, though not in this area, and the female condom is not currently sold or distributed locally. We therefore did not have the opportunity to explore actual use of either of these products in real world contexts. We report here on findings from the exploratory ethnographic inquiry into women's concepts, understandings, and uses of various prevention options, and the potential benefit women-initiated prevention methods, like microbicides and the female condom, might offer if available.

Study Sites and Sex Work Populations

We implemented this study in two rural towns in Hainan Province and a small city in Guangxi Province. To protect the confidentiality of our study sites and participants, we will refer to these towns as Fenghuang village (Hainan Province), Yuantou village (Hainan Province), and Paifang city (Guangxi Province). We began the study in the two rural towns in Hainan in the first year and, after completing all data collection there, moved to the small city in Guangxi, repeating all procedures in the second year.

The three study sites had several commonalities as well as important differences regarding the organization of the sex industry, composition of sex workers in the area, and economic conditions. Fenghuang was the poorest of the three sites, with little local industry (except for a state farm located outside town), and a failed and decaying entertainment resort on the main highway entering the town. Yuantou, also agriculturally based, was noticeably more prosperous, with several brick factories and a bottle factory (owned by outside developers) in the town. The most economically developed was the small city of Paifang because of its proximity to the Vietnam border and the resulting significant trade that developed there, as well as the

popularity of the location for business conventions because of the town's beauty.

In all three towns, sex work was predominantly organized as a side-line or hidden industry behind another proprietary enterprise. In all three towns women conducted sex work out of beauty and massage parlors, generally with the legal industry in the storefront, where the women would sit and wait, and sex work conducted in rooms behind the storefront. These rooms also generally served as the living quarters for the migrant women working for that establishment. Fenghuang was different in that it also had an extensive sex industry that sprang up in roadside restaurants located in a string of buildings across the street from the now defunct entertainment resort. (These restaurants no longer served food at the time we were conducting our study.) Yuantou and Paifang also had hotel-based sex workers, often also in attached Karaoke bars (much more common in urban Paifang than rural Yuantou); Fenghuang appeared to have no hotel-based sex industry. Additionally, in all three towns, women living in rented rooms in boarding houses engaged in "free-lance" sex work. The majority of these women were somewhat older (late-20s to mid- or late-30s), married or divorced, and from other provinces. There was little or no evidence of street walkers soliciting sex work in any of the study sites.

The composition of sex workers themselves also varied from site to site. Hainan Island has a significant ethnic minority group called the Li (not found in Guangxi Province). The Li originate from some of the more remote, mountainous areas of the island, and appear in general to be poorer and have less formal education than Han on the island. Fenghuang had a predominance of young Li sex workers based in the roadside restaurants on the outskirts of town, though in the town itself, many working in the beauty and massage parlors and in the boarding houses were Han (both from Hainan and migrants from mainland provinces). Both Han and Li were represented in the establishments in Yuantou. Paifang sex workers were predominantly Han, with a very small number of other ethnic minorities. Many women in all study sites were from distant provinces around the country who had come to their current town within the prior 1–3 years.

Research Methods

The study combined exploratory ethnographic methods and a behavioral/attitudinal survey to assess women's experiences and understandings of various approaches to prevent HIV and STI. Because most microbicides will likely be vaginal gels or creams similar to contraceptives, and because pregnancy prevention sometimes also prevents HIV/STI, we also explored women's experiences with and knowledge of contraception of all kinds. Findings from the survey are reported

elsewhere (Wang et al., 2006). We focus here on the initial ethnographic assessment of women's prevention concepts and their meanings.

Our international research team conducted this study with the direct assistance and support of the provincial-level and county/municipal-level "anti-epidemic stations." (The Chinese now refer to "anti-epidemic stations" as Centers for Disease Control (CDC). Researchers from the U.S. based Institute for Community Research (ICR) and the Beijing based Peking Union Medical College (PUMC) subcontracted with the provincial level CDC, who then arranged with county and township health educators and health care providers to implement the study. ICR and PUMC researchers provided training in research methods and protection of human subjects to local and provincial CDC staff, guided the collection and processing of data, conducted analyses, and presented findings to the study sites. CDC staff and local health workers provided input on recruitment procedures and incentives, recruited and screened participants, got informed consent, and conducted all interviews and surveys. This close working relationship between the researchers and the site-based health educators and health workers was crucial to the study. All research protocols and consent procedures were reviewed and approved by Institutional Review Boards at PUMC and ICR.

Prior to initiation of the study, the investigators, along with local project staff, observed the community and gained access to many of the establishments where sex work takes place. The second author has worked in the study towns for many years conducting STI and HIV prevention and epidemiological research, collaborating with local health promoters and health care providers to gain entree into sex work establishments, and thus has built rapport and trust with many of the owners and women who work for them. The first author had conducted extended prior research in Beijing and speaks Mandarin, which improved her rapport with some of the proprietors and sex workers. To establish and maintain the trust needed to conduct this study, the investigative team and local research staff used a non-judgmental approach with establishment owners and workers, made clear their purpose of gathering information on issues related to the health of the women and their clients, and always delivered health promotional information and materials, such as free condoms, at each visit. Many of the local health promotion staff were well known because of this ongoing work in the community. This strengthened the perceived trustworthiness of the research team.

Trust was also enhanced by establishing research protocols that protected the identity of participants and provided privacy for all research activities. Prior to conducting any interviews, research staff obtained informed consent. No identifying information was included on any data forms. Interviews were conducted in private

rooms away from the establishment in which the women worked but within easy traveling distance. The project provided transportation to the interview, and upon completion of the interview, each participant received a small gift package with toiletries and other health items as well as free condoms. The small gift package cost the equivalent of approximately 20 Chinese yuan (about \$2.50 US).

We initiated data collection at each site with two ethnographic elicitation exercises designed to explore the methods women sex workers know about and use for either contraception or STI/HIV prevention, their experiences with these methods, and the meanings they attribute to them. Little is currently known about these women's knowledge, understanding, and application of prevention options, particularly in this context. We, therefore, utilized these elicitation techniques because they are specifically appropriate for exploring new areas for which there is little cultural understanding of an issue (Borgatti, 1999). The first was a *free list* exercise, designed to generate as complete as possible a list of prevention methods these women know or have heard about. The second was a *pile sort* exercise, in which women categorized the free listed prevention options according to their own conceptual and experiential understandings. We will describe each of these methods more fully in turn.

We recruited a purposive sample for this elicitation component of the study (both the free list and pile sort exercises), which included women from major local ethnic groups, working in different types of sex work establishments, and of various ages and marital status. Sampling was designed to provide representation from the major subgroups among local sex workers to generate the greatest breadth of perspectives, but was not necessarily a proportionately representative sample that might limit sufficient inclusion of some groups. Target numbers of subgroups were determined based on prior assessments the second author conducted in these sites in the late 1990s and in 2000 on the composition of the sex work population (Liao, 1998; Liao, Schensul, & Wolffers, 2003), and with input from local CDC and health education staff about current conditions. All participants were recruited through walk-up introduction by outreach staff, who explained the project and escorted women to the interview location.

To conduct the *free list* exercise, we asked a small number of women (16 in each town) to respond to the following statement: "Tell me all the ways women protect themselves from pregnancy and infection. Include everything you have ever heard about." After probing for as complete a list as each participant could generate, we then asked which methods they currently use or had ever used, and in what situations (e.g., at what age, with what type of partner, in what location or living situation, etc.). We used Atlas-ti (Muhr, 1999) to code and analyze the narrative data on women's explanations

of these prevention methods and the context of their use.

We then constructed a composite inventory of all free listed items, even if mentioned only once. Several contraceptive methods of interest to us (because of their similarity to microbicides) were never mentioned, so we added them to the list for the pile sort exercise. We made a card for each method, with its name and a visual depiction if possible on one side and a number on the other, for the pile sort exercise. We conducted the free list exercise in the two towns in Hainan before generating cards for the pile sort. Although we repeated the free list exercise in Guangxi Province the next year, no new items emerged to add to the list of cards for the pile sort in that province.

We conducted the *pile sort* exercise with 24 women from each of the three study sites, none of whom participated in the free list exercise. To conduct the pile sort, we took the 37 cards containing prevention items generated from the free list and instructed each woman to sort all 37 cards into piles that contain items she thinks go together. Participants were allowed to make as many piles as they wanted, but each pile was required to have at least two items in it. The interviewer then recorded the numbers from the cards in each pile and asked the participant to explain why she felt those cards belonged together. Narrative explanations were also recorded for each pile. Some women had limited understanding of some of the prevention methods or were illiterate. When the participant did not understand a prevention method, staff would give a limited explanation of what it was (e.g., sterilization operations, contraceptive cream, etc.). In cases in which the participant could not read the cards, particularly those cards with no possible visual depiction (e.g., refuse sex with a man who won't use condoms, sex without intercourse, etc.), the interviewer read through the whole list of cards one or two times, as needed, and then assisted the participant to create the piles by reading each one and asking her with which other items to place it.

We analyzed quantitative and qualitative pile sort data separately. The numeric data generated by listing the card numbers in each pile were imported into ANTHROPAC (Borgatti, 1992), which computes correlations between each card and every other card to construct a matrix that indicates a "cultural pattern" of card combinations. ANTHROPAC also computes each individual's personal correlation score in relation to the card correlation matrix of the total group to determine the degree of "cultural fit" of each individual relative to the group. Individual correlation scores were imported into SPSS 11.0 and linked with demographic data to determine differences in "cultural fit" by age, ethnicity, town of origin, marital status, educational attainment, and sex-work establishment. Using ANTHROPAC, hierarchical cluster analyses also indicated card associations, and non-metric multi-dimensional scaling was used to plot aggregate responses on a two-dimensional "cultural map" illustrating participants'

patterned associations of prevention methods (Borgatti, 1999). The narrative data explaining each of the piles were imported into Atlas-ti and coded with the labels of each of the cards included in that pile. Narrative explanations provided a means to interpret the cognitive map and card correlations, to compare classifications of prevention options by different groups of women, and to assess the usefulness of the pile sort exercise to illuminate the understandings and meanings of these prevention options for women in the study.

Findings

Sample and Sex Work Establishments

Table 1 indicates the demographic characteristics of the women who participated in the elicitation component of the study, differentiated by study site. Samples varied across sites by ethnicity, age, marital status, and type of site in which women engage in sex work. Fenghuang had the highest proportion of Li minority, and also included many young and poorly educated women, all of whom were single. The other two towns included married women (who were primarily migrants from other provinces and were separated or divorced from their husbands). The sampled women from the urban site (Paifang) were significantly older and likely to have more education than those from the two rural

Table 1. *Demographic Characteristics and Recruitment Sites of Women in the Ethnographic Component of the Chinese Microbicides Acceptability Study (Percentages)*

	Fenghuang (n = 40)	Yuantou (n = 40)	Paifang (n = 40)	Total (n = 120)
Ethnicity*				
Han	47.5	67.5	80.0	65.0
Li	52.5	27.5	—	26.7
Other	—	5.0	20.0	8.3
Age group*				
16–17	35.0	5.0	—	13.3
18–24	65.0	45.0	50.8	
25+	—	50.0	57.5	35.8
Marital status*				
Single	100	55.0	42.5	65.8
Married	—	40.0	45.0	28.3
Divorced	—	5.0	12.5	5.8
Educational attainment				
No formal education	—	2.5	2.5	1.7
Primary School	37.5	42.5	27.5	35.8
Junior High School	52.5	47.5	52.5	50.8
Senior High School	10.0	7.5	17.5	11.7
Recruitment site (Sex-work establishment)*				
Roadside restaurant	97.5	—	—	32.5
Beauty or massage parlor	2.5	40.0	35.0	25.8
Boarding homes	—	60.0	32.5	30.8
Hotel	—	—	32.5	10.8

*p < .001

sites. Roadside restaurants were only evident in Fenghuang village; they tended to be the predominant work site of Li women. Younger Han women tended to work in beauty and massage parlors and in hotels (scarce in the rural towns), and older Han women worked out of the boarding houses in which they lived.

Most of these women's work locations were also the places they lived, usually in small rooms behind the establishment entryway or on upper floors of the same building. In most establishments, the owner not only provided the women with living quarters (which often doubled as places to take clients), but also provided meals and protection. In exchange, women paid the establishment owner a portion of the money she received from clients. (The exception was boarding houses, in which occupants simply paid rent to the landlord, but cooked their own meals, often in a common kitchen area.) Relationships between women working at the establishment (or living in the boarding house) with each other and with the establishment owner or landlord were sometimes very close and potentially very supportive. As indicated below, these relationships among sex workers at the establishments and between workers and the "boss" were important with regard to shared understandings of sexual risk and options for protection, including disease and pregnancy prevention.

Free List Results

Table 2 indicates the items generated by the free list exercise and the number of participants who mentioned each. All women listed male condoms for either STI or pregnancy prevention. Most also listed the birth control pill and nearly half indicated the IUD for contraception. Commonly mentioned for both pregnancy and STI prevention was genital cleaning and washing, particularly douching with or without popular douche products (lotions). Of particular interest is the frequent mention of using antibiotic (anti-inflammatory) shots, pills, or suppositories to prevent (as well as to treat) STIs. Also notable was the array of behavioral approaches indicated to reduce both risk of infection and pregnancy, including squatting or urinating after sex, getting regular medical check-ups, looking at the partner's genitalia, and folk remedies such as drinking ice water after sex and use of a traditional Chinese medicine patch on the abdomen. Items absent from the participant-generated list were also important, including most vaginally inserted contraceptive products and the female condom. (Many of the products absent from the free list are not available locally.)

Uses, Contexts, and Preferences of Free Listed Prevention Methods

The prevention methods most commonly free listed were also reported as most frequently used. All women reported using male condoms, indicating a range of

Table 2. Free Listed Prevention Options (*N* = 48 female sex workers)

Free listed items mentioned 11 + times	Free listed items mentioned 1 time only
Male condom (48)	Refuse sex with a man who looks dirty
Contraceptive pill (41)	Avoid sex
Lotions for douching or washing (37)	Vasectomy
Anti-inflammatory shot or pill (35)	Refuse sex if man won't use a condom
IUD (23)	Anti-inflammatory shot after period
Wash after sex (15)	Morning after pill
Contraceptive shot (15)	Wash before sex
Free listed items mentioned 4–10 times:	Douche with applicator
Insert pill/suppository before sex (10)	Items <i>never</i> mentioned in free list:
Contraceptive film (10)	Contraceptive gel
Withdrawal (9)	Contraceptive patch
Tube ligation (8)	Male condom with spermicide
Rhythm method (7)	Contraceptive foam
Squat after sex to get semen out (5)	Contraceptive cream
Regular check-ups (4)	Diaphragm
Look at penis for signs of disease (4)	Contraceptive sponge
	Have same partner for long time
	Female condom
Free listed items mentioned 2 or 3 times:	
Sex without intercourse, masturbating the man (3)	
Drink ice water immediately after sex (3)	
Put medicine patch on bellybutton (3)	
Urinate after sex (3)	
Norplant (2)	

views on their use regarding whether they liked them and felt comfortable negotiating to use them with partners, and in which contexts to use them. For example, one young woman said: "I used them with guests [clients] in the roadside restaurant or when the guests take me outside [to another location] if the man agreed to use them. But if he wouldn't use it, I refused to have sex with him" (Fenghuang, single, Han, age 17). Another from the same town said, "I only used them after coming to Fenghuang because the owner of the massage parlor told me that whenever I have sex with a guest, I should use one. If guests refuse, I refuse sex because the owner told me to" (Fenghuang, single, Li, age 19). Still another reiterated the influence of co-workers and the establishment owner to use condoms when she said, "When I arrived in Fenghuang, the female boss and 'sisters' [co-workers] told me about [condoms]. Most of the guests will use them and a few of them use [condoms] after you persuade them. In the past, I also had sex without a condom if the guests gave me more money. After that, I would use liquid medicine or toothpaste to wash. . . . I seldom use condoms when

I have sex with my boyfriend" (Fenghuang, single, Han, age 19).

While many women felt positively about condoms, others were less favorable, citing difficulty negotiating their use, reduced sensation, partner resistance, and the desire to differentiate intimate partners by way of non-condom use. For example, one woman commented, "I liked that condoms prevent STI, AIDS and pregnancy. But they're not convenient to use; you have to persuade the man. The man doesn't like them because he feels they depress his sexual function" (Yuantou, single, Han, age 19). Another said, "I don't use condoms with my husband or lover. I like condoms for contraception and prevention of viruses, and they're clean. But I dislike that they're easily broken, and you feel dry and it's torturous" (Yuantou, married, Han, age 33). Yet another said, "About half my clients use condoms; the others don't want to because they feel I have no diseases and they think the condom is uncomfortable. My partners can't get used to it" (Paifang, married, Han, age 33). For these women, prevention options that do not reduce sexual pleasure or require negotiation or that women feel comfortable using with intimate partners may provide the means to reduce their sexual risk.

In addition to condoms, women described their use of a variety of other prevention methods of greater or lesser effectiveness, generally in situations in which the women were unable or unwilling to use condoms. Commonly reported was the use of antibiotics (anti-inflammatory shot or pill), with or without a prescription, either as a shot received routinely (e.g., after menstruation), or in response to apparent symptoms or discomfort. Regarding antibiotic shots in response to symptoms, a young woman from Fenghuang said, "After sex I feel my body is 'hot'; even my under-parts feel hot and I want to get a shot. When I feel itching I also want to get a shot" (Fenghuang, single, Li, age 17). (Her reference here to feeling "hot" expresses a traditional Chinese concept of internal heat and cold as these relate to the balance needed for good health.) Others spoke of more routine use of antibiotic shots, like the following two women: "I regularly get a shot after my period because it's good for my [gynecological health]. Usually I go to the township hospital and tell the physician that now my period is over and I want an antibiotic shot. This is quite normal. It's good for you. It's not costly" (Yuantou, married, Han, age 40). "Every month the third day after my period, I get a shot. Other sisters told me to do so" (Yuantou, single, Li, age 20). Antibiotic pills are often used the same way, as the following women indicate: "Every 10–20 days I take antibiotic pills. I take them when my under-parts feel hot. I started this after I came to Yuantou" (Yuantou, married, Han, age 33). "The first time, I took this from a physician's prescription. Later, sometimes I took the pill myself because I think it protects both the man and the woman" (Yuantou, married,

Han, age 40). These reports suggest potential significant reliance among these sex workers on antibiotics as a prevention measure, rather than as specific treatment in response to medically indicated symptoms.

Also common were reports of douching for hygiene or STI and pregnancy prevention. Women reported using several materials for douching, including warm water, salt water, douche products (lotions), and even toothpaste (often provided for free in hotel rooms) if nothing else was available. Descriptions of use include comments like the following: "After sex I use a lotion to douche; this isn't for prevention or contraception, just to feel clean" (Fenghuang, single, Li, age 19). "If the client didn't use a condom, I use [Fu yin jie brand] lotion to douche" (Yuantou, single, Li, age 19). "After I have sex I will use toothpaste to wash in the hotel" (Paifang, single, Han, age 23). "After sex use salty water to wash genitals to prevent infections" (Yuantou, married, Han, age 40). Many also report douching several times a day after sex, or at least daily for cleansing.

If vaginally inserted medications or cleansing products were not available, some women also reported utilizing more "folk" remedies as a last resort to reduce the possibility of pregnancy or infection. Several women mentioned squatting after sex for this purpose: "If the man ejaculates in the body, go to the toilet and squat for 5 minutes" (Fenghuang, single, Han, age 19); "After sex, drink water, go to pee and squat for half an hour" (Yuantou, single, Li, age 20). Others mentioned using a traditional Chinese concept of changing the body's inner "temperature" balance by drinking icy or very cold water after sex, thereby minimizing the potential virility of the infectious agent or sperm: "After sex, immediately drink ice water; it may kill some of the bacteria" (Fenghuang, single, Han, age 18); "After sex, drink ice water; you should have really icy water, not just cold water. This can prevent pregnancy" (Fenghuang, single, Han, age 17). Reports of these "folk" remedies were rare, and it is unclear how commonly used they are among the prevention options women in the study mentioned.

Women also indicated using non-penetrative sex and withdrawal as prevention options, as in the following suggestion: "Ejaculate outside the body; when I have sex without a condom I use this method. [He] can also continue in between the legs at the top of the thighs and ejaculate there. It's not good, but I can use it in an emergency situation" (Fenghuang, single, Han, age 19). Another woman said, "If the client refuses a condom, immediately when he ejaculates I push him away. This may prevent pregnancy and more or less prevent some disease" (Yuantou, Han, single age 18). Yet another suggested hand sex as a safer alternative: "Have sex with the hand; when I was 17 years old I did this with clients in Fenghuang. It doesn't waste energy and I can avoid disease" (Fenghuang, single, Han, age 19). Finally, as a last resort, several women mentioned observing the man's penis to detect disease: "If a man

refuses to wear a condom, the sisters taught me to look at his penis to see whether there is pus or a sore on the skin. Whenever I see that, I can't have sex with that person" (Yuantou, Han, age 18).

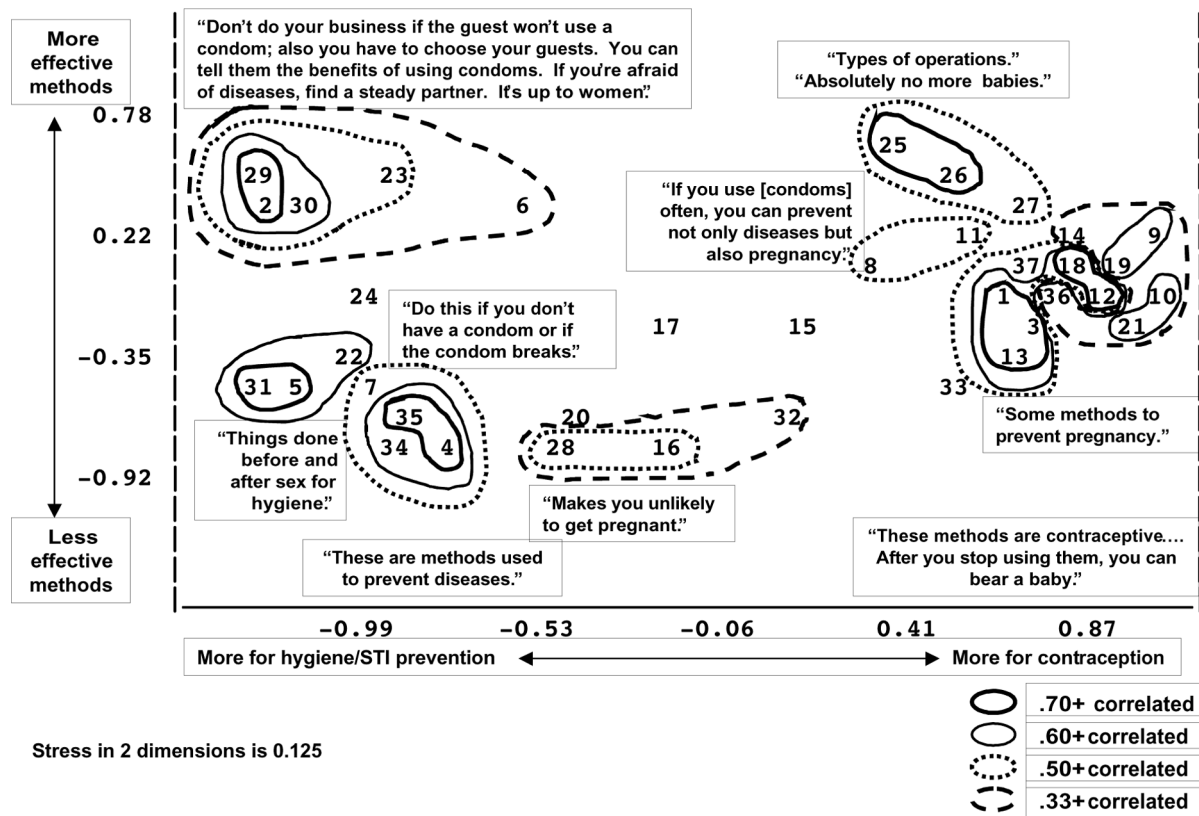
Pile Sort Results

A total of 72 women completed the pile sort exercise (24 from each town). These included 45 Han (62.5%), 21 Li (29.2%), and 6 of other ethnicities (8.4%), of whom 47 were single (65.3%) and the rest married or divorced. They were recruited from roadside restaurants (33.3% of the sample, all from Fenghuang), massage and beauty parlors (27.8%), boarding houses (27.8%), and hotels (11.1%).

Correlational analysis of card combinations using ANTHROPAC (Borgatti, 1992), which indicated the likelihood that any given card would be grouped with each of the other cards, generated a matrix of card correlations. This matrix constituted the "cultural pattern" of associations among prevention methods for this study sample, reflecting the repeated patterning women followed in conceptually linking prevention options with each other. These analyses also generated individual participants' scores of "cultural fit" (i.e., the degree of consistency between the way that participant grouped prevention methods in comparison to the pattern of the rest of the sample, with higher scores indicating better "fit"). We used individual correlation scores of cultural fit to compare participants by demographic characteristics using one-way ANOVA in SPSS. Results indicated significant differences by ethnicity ($p = .001$), with Li scoring lowest in "cultural fit." This was confirmed by significant differences by town (Fenghuang had lowest score and highest number of Li) and recruitment site (roadside restaurants had lowest score and highest number of Li). Differences by age group were also significant ($p < .01$), with youngest (16–17) and oldest (25–40) scoring lowest. However, differences by marital status were not significant.

Because of the significant differences in "cultural fit" by ethnicity, we analyzed the pile sort data separately for the two primary ethnic groups. Analyses of individual scores of "cultural fit" among Han indicated the following: (1) differences by recruitment site were significant ($p = .05$), with lowest scores among Han women recruited from roadside restaurants and boarding houses, and highest scores among those in hotels and parlors; (2) differences among Han by education were significant ($p < .01$), with primary and senior high school graduates scoring lowest; and (3) differences among Han by age group, town and marital status were not significant. However, among Li we found no significant differences by age, recruitment site, town, marital status or education level.

These analyses of correlation scores indicated that the most consistent cultural pattern in pile sorting, which set



- a Numbers on the cognitive map refer to cards labeled with prevention methods as follows:
- | | | |
|---|--|---|
| 1-contraceptive film | 14-diaphragm | 25-vasectomy |
| 2-refuse sex with a man who looks dirty | 15-withdrawal | 26-tubeligation |
| 3-contraceptive gel | 16-drink ice water after sex | 27-IUD |
| 4-wash after sex | 17-rhythm method | 28-urinate after sex |
| 5-antibiotic shot or pills | 18-sponge | 29-look at the penis |
| 6-sex without intercourse, masturbate man | 19-Norplant | 30-refuse sex with a man who won't use a condom |
| 7-lotions for douche or washing genitals | 20-insert pill or suppository into vagina before sex | 31-antibiotic shot after menstruation |
| 8-male condom | 21-stick [Chinese] medicine patch on bellybutton | 32-get semen out by squatting after sex |
| 9-contraceptive shot | 22-regular check-ups | 33-morning after pill |
| 10-contraceptive patch | 23-avoid sex | 34-wash before sex |
| 11-male condom with spermicides | 24-have same sex partner for a long time | 35-douche vagina with an applicator |
| 12-contraceptive foam | | 36-birth control pill |
| 13-contraceptive cream | | 37-female condom |

Figure 1. Cognitive map^a of pregnancy and HIV/STI prevention methods from pile sort exercise: Han women.

the “standard” for the whole sample, appeared to be generated by Han women in the age group of 18–24 working primarily in massage and beauty parlors and in hotels. Assessing the frequency with which women clustered specific cards together, we found that Han women were significantly more consistent than Li women in the ways they combined the cards. Han women created 6 groupings in which 2 or 3 cards were placed together over 70% of the time (see Figure 1). These included: group (1) vasectomy [card #25] and tube ligation [#26]; group (2) contraceptive gel [#3], film [#1], and cream [#13]; group (3) contraceptive foam [#12] and sponge [#18]; group (4) refusing sex with a man who looks dirty [#2] and looking at the penis [#29]; group (5) antibiotic shot or pill [#5] and

antibiotic shot after period [#31]; and group (6) wash after sex [#4] and douche with an applicator [#35]. They created an additional six clusters of cards that they put together over 60% of the time. These included: group (1) most vaginal contraceptives (combining groups 2 and 3 above); group (2) contraceptive patch [#10] and Chinese medicine patch on the bellybutton [#21]; group (3) contraceptive shot [#9] and Norplant [#19]; group (4) refusal of sex if he is dirty and checking the penis (group 4 above) with refusal of sex if he won't use a condom [#30]; group (5) medical check-ups [#22] with antibiotic shots and pills (group 5 above); and group (6) all washing before and after sex and douching (group 6 above plus #34). This consistency in clustering specific items indicates a high degree of agreement

among the Han regarding their concepts about these prevention methods and the degree to which the methods are related, even if women's reasons for grouping these methods might differ, as described more fully below.

By contrast, Li women were highly inconsistent in the ways they sorted the cards. Li participants grouped only one set of cards together 70% of the time, which included antibiotic shot or pill and antibiotic shot after period. In fact, Li women created no other card grouping that occurred 60% of the time or more. In looking more closely at the piles and the explanations Li women provided for their groupings, we identified several factors that might help explain this overall lack of consistency in card sorting among Li. First, card groups Li women created frequently included items that clearly did not relate to the explanation they gave for the pile. Nevertheless, reviewing the many cases in which this occurred did not reveal any specific pattern, but rather an apparent randomness of placing seemingly unrelated or unexplained items within their various piles. Second, while all subgroups of women, regardless of ethnicity, age group, etc., included some who created piles of items they identified as unfamiliar (with explanations such as, "I don't know what these are," or "I've never heard of these"), a significantly higher number of Li women did so, and several also labeled more than one of their card piles with this same explanation. A third consideration is that interviewers indicated that a high percentage of Li women were illiterate, spoke only Li dialect or very poor Mandarin (though a Li interpreter was available), and had very limited formal education. Thus, it is possible that a large portion of Li women were unfamiliar with many of the prevention methods on the cards, or could not read, understand, or remember the cards. They therefore may have placed unfamiliar items in piles in ways that did not reflect any meaning.

The pile sort exercise requires a relatively high degree of understanding of what the prevention options on the cards are and the ability to recognize and remember the card content in order to organize the piles; otherwise the validity of the pile sort data is questionable. We believe that, for the reasons indicated above, the pile sort exercise was inappropriate for the Li subsample. It is, therefore, likely to hold little explanatory value for elucidating Li women's understandings and knowledge of STI/HIV and pregnancy prevention and for assessing their potential readiness for new approaches like microbicides and female condoms. Other exploratory methodologies might be better suited to seek patterns in their knowledge, use, and understandings of these prevention options. For this reason, we will focus the remainder of the article on further explication of the pile sort findings with Han women only.

Consistency in grouping cards together indicates more clearly patterned conceptual associations of these prevention methods among Han as compared to Li women. However, consistency is not an indication of

accurate knowledge of the effectiveness and benefits of prevention options, nor does it clarify the reasons Han women chose to associate specific prevention methods with each other. To understand better the meanings attached to these prevention options and women's knowledge and understanding of their uses, we analyzed the narrative explanations they gave for their card piles.

Explanations of Card Sort Piles

Figure 1 provides a two-dimensional display of the relationships among cards generated by a non-metric multi-dimensional scale of the pile sort data from Han women (displayed on a two-dimensional graph). This "cognitive map" reflects the general pattern of associations (cards more often placed together in the same pile are closer to each other on the graph, while cards less often placed together are further away from each other). We have indicated on the map the major clusters described above according to the rate of their correlation. Some women created a small number of large piles and others a large number of smaller piles. We looked for patterns in their explanations for both the general organization of items and the specific smaller clustering. Their narrative descriptions revealed a general pattern, evident along the X axis, of options they primarily consider are for hygiene or for the prevention of STIs (concentrated on the left side) and those they primarily consider are for prevention of pregnancy (toward the right side). The pattern of placement and their explanations also indicate a general relationship from less to greater effectiveness of the prevention methods along the Y axis (from bottom to top of the graph). We have included on the diagram several quotes from women's pile sort explanations that reflect the attributes they gave to specific clusters or larger segments of the prevention options.

However, consistency in grouping or associating specific prevention methods with each other does not necessarily equate to consistency in women's reasons for similarly clustering cards, reflecting differences in the meanings they attributed to those items. Frequently, those differences involved the degree to which women attributed effectiveness to a set of prevention methods. For example, the cluster that includes cards 28 (urinate after sex), 16 (drink ice water immediately after sex), and 32 (get semen out by squatting down) were variously described as follows: "Makes you unlikely to be pregnant" (Yuantou, married, age 21); "These are common [folk] knowledge about intercourse" (Yuantou, single, age 20); "Cannot prevent pregnancy and diseases" (Paifang, single, age 20); and "Prevents virus-caused diseases in vagina after sex with a man" (Yuantou, married, age 31). In another example, the cluster that includes cards 35 (douche with applicator), 4 (wash after sex), 34 (wash before sex) and 7 (lotions for douching) were described as follows: "In order to protect my health, I

douche to prevent pregnancy and diseases” (Fenghuang, single, age 17); “These are only washing to make you clean; they can’t prevent pregnancy or diseases” (Paifang, single, age 20); “They can prevent STI but not AIDS and pregnancy” (Yuantou, single, age 20); and “These are all used for washing or douching, a sort of preventive medicine (Yuantou, single, age 19). Likewise, the cluster including cards 31 (anti-inflammatory [antibiotic] shot after period, 5 (anti-inflammatory shot or pill) and 22 (regular [medical] check-ups) were described as follows: “They are good for the body; they get rid of inflammation and kill bacteria” (Fenghuang, single, age 18); “These are mainly about prevention or to see if you have any disease” (Yuantou, single, age 19); and “They can treat some sort of inflammation but they cannot prevent STI and AIDS” (Yuantou, single, age 20). These variations in their descriptions of similarly grouped prevention methods indicate potential differences in beliefs about, exposure to information about, or experiences related to use of these options.

Discussion

The elicitation component of our microbicide and female condom readiness study among women sex workers in southern China provided an in-depth exploration of their pregnancy and STI/HIV prevention knowledge, experiences, and understandings, and the meanings they give various prevention options. Our free list, narrative, and pile sort data indicated that many women in the study have considerable knowledge about contraception and HIV/STI prevention methods, and are particularly well informed about male condoms. However, many also have significant misconceptions about what are safe and effective prevention approaches. Additionally many, particularly Li women, appear to lack basic information about both contraception and the prevention of STIs, including HIV.

All of the women who participated in the free list exercise and many who did the pile sort reported using male condoms for the prevention of STIs or contraception. Many women said they insist on condoms every time with clients. However, they encounter numerous difficulties in ensuring consistent condom use. These include their own or their partner’s dislike of male condoms or discomfort using them, desire for intimacy signified by non-use of condoms, and the need for more income. These are typical reasons for unprotected sex found in numerous other studies (Bowleg, Lucas, & Tschann, 2004; Lau et al., 2002; Pulerwitz, Amaro, DeJong, Gortmaker, & Rudd, 2002; Weeks, Grier, Romero-Daza, Puglisi-Vasquez, & Singer, 1998). Women’s inconsistent ability or desire to use male condoms with their paying or primary partners results in much exposure to risk. Use of the female condom was

not an option, given its unavailability locally, and few women had any knowledge of its existence.

Even so, the majority of women in the study are taking multiple steps to protect themselves from infection, even if they are unable to ensure one hundred percent condom use. They use a combination of more and less effective methods to maintain their health, both to prevent diseases and to ensure the possibility of future child bearing. While some of the methods they utilize have little known effectiveness for disease prevention, women generally indicated they used these only if they were unable to utilize more effective though complicated ones, like male condoms, which require negotiation and partner cooperation. If negotiation is too difficult, women will use other approaches at least to have a sense that they are protecting themselves. Thus, they appear to follow an indigenous harm reduction approach to STI prevention, insisting on male condom use and refusing sex without it when possible, but reverting to manual or non-insertive sex, washing, and use of antibiotics when insistence on condom use fails.

Nevertheless, some of their substitute prevention practices may be more harmful than beneficial. For example, frequent douching to prevent HIV or STDs may have the opposite outcome by reducing the natural protections in the vagina. Also, repeated and regular use of antibiotic shots, pills, and suppositories for general prevention of vaginal infections has the potential to contribute to development of resistant strains of infectious agents, thereby reducing women’s ability to treat infections effectively. Further, the development, testing, and promotion of effective vaginal microbicides might be complicated for Chinese sex workers, who douche with many untested vaginal products and insert vaginal antibiotics ostensibly to achieve the same purpose. Promotion of effective microbicides will require discouraging current practices while encouraging similar ones with a different product or products. However, all of these alternatives appeared to be second-choice relative to male condom use, suggesting limited likelihood of “condom migration” (Foss, Vickerman, Heise, & Watts, 2003) for those women who can successfully negotiate condom use should vaginal microbicides become available.

Ironically, some of these common, though problematic, prevention practices also have positive implications for the potential use, acceptability, and efficacy of vaginal microbicides for HIV/STI prevention with this population. Though few women are using vaginal contraceptives, their use of douches with applicators and antibiotic suppositories for STI prevention suggests readiness for a vaginally inserted product used to prevent HIV, such as a microbicide or the female condom.

Behaviorally microbicides in general may be acceptable for Chinese sex workers; however, we need to consider carefully the context of sex work and the diverse needs of the different subgroups when testing, educating on and promoting microbicides. The elicitation data

revealed significant differences by ethnicity, age, and other characteristics regarding women's concepts of prevention methods. This confirms the need to tailor prevention messages to women in different contexts and of various backgrounds to address specific areas of misinformation among each, and to build on their knowledge and common practices to enhance their use of effective and safe prevention methods. In the case of Li women in Hainan, increased dissemination of contraceptive and prevention health information through oral as well as written messages and utilizing Li dialect are needed. Also, because many of the women in this study, both Han and Li, are very young and unmarried, reproductive health information, generally provided in China through birth control institutions, may not be available to them through those channels. This suggests the ongoing need for general public health institutions to reach these women with information and prevention materials. In particular, the most effective incentive to promote HIV and STI prevention is to inform women of the significance of doing so to protect their future ability to bear children, an issue of great concern for many of the younger women.

An additional finding from the narrative data bears mention. Many women reported during the free list exercise that they learned about prevention methods from the "boss" of the establishment (some of whom are women) or other "sisters" who work there. This suggests the promise of working within the establishments to develop supportive prevention interventions and to disseminate and promote accurate information about new prevention options, such as vaginal microbicides and the female condom. A peer-delivered or site-based intervention may be an effective means to support the adoption of these novel HIV/STI prevention options because of the limitations for young or single women to access this information through the official birth control infrastructure and the difficulty of public health workers to gain access to some of the sex work establishments. Promoting microbicides and female condoms in these venues has the potential to prevent an unimpeded sexually transmitted HIV epidemic.

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