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ORIGINAL PAPER

Correlates of HIV Risk and Preventive Behaviors in Armenian Female Sex Workers

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Abstract This study describes HIV risk and preventive behaviors and their correlates among Armenian female commercial sex workers (CSWs) as a prerequisite to developing gender and culturally appropriate interventions. Ninety-eight CSWs from three Armenian cities were interviewed using a structured questionnaire. Quantitative findings were further elaborated by focus group discussions ($N = 25$) and key informant interviews ($N = 8$). Inconsistent condom use with all types of sexual partners was reported, as were condom tear/slippage, alcohol and drug use, and sex with drug injecting clients. Prominent misconceptions regarding HIV transmission, prevention and disease manifestations were noted. Correlates of condom use intentions included history of substance use, attitudes regarding condom use, risk perception, and comfort negotiating condom use. Intentions to use condoms were strongly associated with recent frequency of condom use. Understanding the relationship between condom use and its determinants is critical in the design and implementation of effective prevention programs tailored for Armenian CSWs.

Keywords HIV/AIDS · Behavioral interventions · Armenia · Commercial sex workers · Condoms

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Introduction

Armenia, a country of the former Soviet Union (fSU) located in the Southern Caucasus, has not yet experienced a generalized HIV/AIDS epidemic. As of September 2005, 332 HIV-infected persons had been reported to the Ministry of Health (National Center for AIDS Prevention of the Republic of Armenia, 2005) and the estimated HIV prevalence in 2002 was $<0.1\%$ (Grigoryan, Mkrtchyan, & Davidyants, 2002). Compared to other countries of the fSU, some conditions present in Armenia may have thus far limited the spread of HIV. For example, Armenia remains a traditional society with strong family ties and traditional social-cultural norms and values. The latter, along with a relatively low HIV prevalence provide a unique opportunity for prevention. However, this window of opportunity is narrow due to recent social and political changes that have resulted in an increase in drug use,

commercial sex, unemployment, economic insecurity and labor migration, factors that have fueled the HIV epidemic in other FSU countries such as Russia or Ukraine (Papoyan, Arakelyan, & Bakshinyan, 2005).

Epidemiological surveillance conducted in 2002 demonstrated that, although the HIV seroprevalence among female commercial sex workers (CSW) was below 3%, it far exceeded that of the general population (Grigoryan et al., 2002). Because HIV prevalence in Armenian CSWs is lower than in sex workers in neighboring countries (UNAIDS, 2004), prevention efforts targeted at this group may be effective in limiting the spread of HIV.

Limited information is available on sex work in Armenia. The Department of Control of Illegal Trade in Drugs and Commercial Sex, located within the Ministry of Internal Affairs, is the official agency responsible for enforcement of laws and policies that govern sex work and for the development and implementation of strategies directed to sex workers. According to official data, in 2000, there were approximately 1,500 registered female CSWs in Armenia with 900 living in the capital city of Yerevan (Grigoryan et al., 2002). Public health experts, however, suggest that these official numbers underestimate the true number of CSWs and that commercial sex work is substantially more widespread with approximately 7,000–8,000 CSWs in the entire Republic (Grigoryan et al., 2002).

Sex work in Armenia is considered illegal under Civil Code, but it is not prosecuted by the Criminal Code (Shatvoryan, 2001). Nonetheless, pimping, running brothels, infecting others with sexually transmitted infections (STIs), and intentionally infecting others with HIV are considered criminal offences (Criminal Code of the Republic of Armenia, Articles 262, 124 and 123, 2003) and may be prosecuted.

There are several groups of CSWs in Armenia. The largest and most disadvantaged are the ''street'' sex workers who work individually, without protection from pimps or their peers. They gather in specific locations in the evenings, meet their clients, negotiate specific terms, and go to locations such as hotels, saunas, bathhouses, and bars, to provide services. Street CSWs are the main target of actions implemented by the regulatory and law enforcement agencies.

Another group of CSWs in Armenia operate through pimps or in houses. In comparison with ''street'' sex workers, they are considered to be privileged, because they are somewhat protected from regulatory and law enforcement agencies and have a more stable income. Other groups of CSWs in Armenia include ''elite'' CSWs who provide services to a limited group of wealthy individuals; ''casual'' CSWs who operate from time to time out of economic need; and ''migrant'' CSWs who travel abroad to engage in sex work (Grigoryan, Petrosyan, & Shahbazyan, 2004).

The results of the few studies conducted to date among CSWs indicate that they have no other source of income except for commercial sex work. Furthermore, the majority have children and parents for whom they are the only source of income (Grigoryan et al., 2002; Melikian, 1999; Shatvoryan, 2001).

As the experience in other countries has demonstrated, the most effective approaches to HIV prevention among CSWs are structural interventions, which change laws, policies and societal norms (Peterson & DiClemente, 2000). For example, a well-known structural intervention with CSWs is the 100% condom policy in Thailand. As a result of that program, there has been a corresponding increase in condom use in brothels from 14% in 1989 to 91% in 1993 (Robinson & Hanenberg, 1997). However, structural interventions are currently not feasible in Armenia because sex work is not organized and there is lack of political and societal will for accepting commercial sex work as a reality. More feasible are theory based behavioral interventions, which also have been shown to be very effective in HIV prevention in a number of at-risk populations in different countries (Belcher et al., 1998; Carey, 1999; DiClemente & Peterson, 1994; Kalichman, Carey, & Johnson, 1996; Kalichman, 1998; Peterson & DiClemente, 2000; Wong, 1995). However, most theory-driven intervention research has been conducted in countries with very different epidemic patterns than those observed in countries in transition, such as Armenia. A literature review resulted in a limited number of scientific articles describing interventions targeted specifically at CSWs (Archibald, Chan, Wong, Goh, & Goh, 1994; Asamoah-Adu et al., 1994; Bhave et al., 1995; Dorfman, Derish, & Cohen, 1992; Ford et al., 1996; Ford, Wiraman, Reed, Muliawan, & Wolfe, 2002; Fox et al., 1993; Ngugi et al., 1988; Swaddiwudhipong et al., 1990; Van Griensven, Limanonda, Ngaokeow, Ayuthaya, & Poshyachinda, 1998; Visrutaratna, Lindan, Sirhorachai, & Mandel, 1995; Walden, Mwangulube, & Makhumula-Nkhoma, 1999). Further, the quality of the evaluations of the majority of those interventions was low, thereby making it difficult to conclude which approaches were effective in reducing HIV risk in CSWs.

The purpose of this study was to provide baseline data on HIV risk factors of Armenian CSWs as a prerequisite to developing a gender and culturally appropriate intervention.

Method

The study was conducted by the Health Education Association NGO in collaboration with the National Center for AIDS Prevention of the Republic of Armenia and Emory University Center for AIDS Research in the US. The study was conducted between January and October 2003 and had three phases. The first phase was a formative research devoted to the development of the study questionnaire. The second phase was a cross-sectional quantitative survey conducted in three cities: Yerevan, the capital of Armenia, Gyumri, the second largest city, and Ashtarak, a mid sized city. The quantitative findings were elaborated during the third phase of the study by focus group discussions and key informant interviews with CSWs.

Phase 1: Development of the Questionnaire

Concepts for hypothesis testing in this study were drawn from various theories of behavior change, including the Social Cognitive Theory (Bandura, 1994), the Information–Motivation–Behavioral Skills Model (Fisher & Fisher, 1992), the Health Belief Model (Rosenstock, Strecher, & Becker 1994), and the Theory of Gender and Power (DiClemente & Wingood, 1995).

Two validated questionnaires were used to develop the study questionnaire (Belcher et al., 1998; DiClemente & Wingood, 1995). However, since both source questionnaires were developed for other target populations (disadvantaged American women), formative research was carried out to refine the variables and measures and tailor them to the target population and to the Armenian social context. Outreach workers selected 25 CSWs from Yerevan known to them as having considerable experience in sex work and who were also willing to express their opinions and actively participate in discussions. Selected participants responded to the predeveloped questionnaires and were subsequently invited to either participate in a focus group or be interviewed as a key informant. Three focus groups with 6–7 participants in each, and 6 in-depth interviews were carried out. Using a field guide with open-ended questions, the facilitator explored whether the language was appropriate and the scales relevant. Modifications were made to the survey instrument based on the CSWs' responses. It was determined, for example, that the majority of questions should be subdivided onto three sub-questions since CSWs stated that they had three distinct types of sexual partners: casual clients (who they meet on the street or in a bar); regular clients (who use the service of one CSW multiple times); and, personal partners (husband or boyfriends) who don't pay for services. Second, the questionnaire was found to be too long. Finally, questions were adapted to make them more relevant in the cultural context of Armenia. The questionnaire was developed in English and subsequently translated into Armenian. The final questionnaire had 51 closed-ended questions (with the majority of questions having three sub-questions) and was back translated into English to ensure that the nature of variables was not altered in translation.

Phase 2: Quantitative Survey

Participants and Procedures

A convenience sample ($N = 98$) of Armenian female street CSWs participated in the study. Seventy-nine were from Yerevan, 8 from Gyumri and 11 from Ashtarak. To be included, women had to be 18 years of age or older and self-recognize themselves as CSW. Since the majority of questions referred to sexual practices during the past week, potential participants who did not engage in sex work during the past week were excluded. Eighty-five percent of CSWs approached/contacted agreed to participate in the study with refusals being primarily due to time constraints.

Once informed consent was obtained, the outreach worker made an appointment with the women for an interview. In order to assure that participant responses were not influenced by others, the appointments were made so that the women came to the interview alone. In some cases, the participants preferred to come in pairs or in small groups. In such cases, they were met by an equal number of interviewers to allow for each to be interviewed individually in a private setting. The interviews were conducted in Armenian and lasted approximately 30–40 min.

Measures

Measures were selected based on their relevance to previously identified constructs associated with the adoption and maintenance of consistent condom use, from the results of the formative research, and from the theoretical models underlying the social skills interventions. Most measures had been validated in prior studies (Belcher et al., 1998; DiClemente & Wingood, 1995). However, some of these measures were modified after the formative research and tailored to the target population. For example, participants were confused by multiple-point Likert scales and thus the scales of the majority of measures adapted

from other studies were limited to 3 points (e.g., agree, disagree, somewhat agree). Demographic information included age, educational level, age of initiation of sex work, number of children, marital status/steady sexual partner and marital status of CSWs' steady sexual partners.

Condom use was assessed according to the method suggested by Kauth, Lawrence, and Kelly, 1992. An open-response format was used where participants were asked to list, by first names, their last three sex partners in the previous 7 days. Participants were asked to classify each partner (casual client, regular client, or personal partner), and identify frequency of vaginal sex and condom use. The proportion of condom use was calculated by dividing the total number of all CSWs' condom-protected sexual encounters with a given type of sex partners (among the last three partners of each CSW from the last 7 days) by the total number of all CSWs' sexual encounters with the same type of partners (among the last three partners from the last 7 days). For example, if women in the sample reported a total of 212 episodes of penetrative vaginal sex with casual clients, of which 160 were condom protected, then the condom use proportion was 160/212 = 0.75 or 75%. Participants also were asked how regularly they used condoms during sexual intercourse with each type of sexual partners. This question was scored using a 5-point Likert scale ranging from *always* to *never*. Consistent condom users were defined as those who answered *always* (DiClemente & Wingood, 1995). Participants were also asked to rate on a 3-point Likert scale the future likelihood of using condoms with each type of partner. This single item was adapted from the study by Belcher et al., 1998. Sexual assertiveness/self-efficacy was measured by five items asking how confident the woman would be to refuse engaging in sex without using condoms in difficult imaginary situations. Perceived participant and partner attitudes for condom use were assessed by a single item inquiring how good, according to the participants and their perceived partners' opinions, does sexual intercourse with condoms feel compared to sex without condoms. Comfort in condom negotiation was assessed by a single 3-point Likert scale item rating the degree of difficulty associated with discussing condom use with each of the three different types of sexual partners.

Participants were asked whether they had ever had problems with condoms such as tear/slippage. If the answer was *yes*, then the respondent was asked how many times it had happened in the last 3 months and in the past week. Two questions regarding the women's control over the quality and effectiveness of condoms used were also included.

The occurrence of anal sex was inquired by asking the participants if they had ever had anal sex, how many episodes of anal sex if any they had during the last month prior to the interview, and how many of those episodes if any were condom protected. Participants were also asked whether they had ever been diagnosed with an STI, how many times, if any, and when they were last diagnosed. Finally, participants were asked if they had changed their sexual practices after having been diagnosed with an STI.

Because the women were apprehensive about discussing drug use due to its criminal status in the country, questions addressing drug use were limited. Participants were asked if they had ever used injection and non-injection drugs and how many times, if any. Participants were also asked whether they had ever had sex with an injection drug user. Three items were included to determine alcohol use before engaging in sexual activity (Belcher et al., 1998). History of physical abuse was measured by two items asking if the participant had ever been physically abused and if she had been physically abused within the past month.

The HIV/AIDS knowledge scale was designed to assess: (a) modes of and misconceptions about HIV transmission (17 items); (b) protective strategies and related misconceptions (8 items); and (c) disease process and clinical characteristics (4 items). The scales for assessing misconceptions and protective strategies were adapted from guidelines developed by the Impact Project (Family Health International, 2002).

Risk perception was measured by four items. Three items asked the participants to rate on a 3-point Likert scale the risk connected with different sexual behaviors should they engage in them (DiClemente & Wingood, 1995), including penetrative vaginal sex with condoms, without condoms, and sex using withdrawal, each with three different types of sexual partners (personal partners, regular clients, casual clients). A fourth item asked CWSs to assess their personal risk for HIV infection on the basis of their behaviors and the perceived seriousness of the AIDS problem in the country and the CSW community. Aggregated risk perception scores were obtained by summing the scores across these items.

Data Analyses

The aggregated scores for each measure were treated as continuous variables. Means and frequencies were used to describe the variables. Because a majority of the variable distributions approximated the normal curve, parametric statistics were used. Pearson correlation

coefficients (r) were used to measure associations between variables. Regression analyses for continuous variables were conducted to estimate multivariable linear associations and effect sizes.

The sample size of the quantitative part of the study was limited by logistical and resource constraints to 98. Considering that correlational analyses were primarily used for analyzing the data, the power to detect a statistically significant relationship between the predictor and outcome variables of interest is 0.82, based on an alternative hypothesis correlation coefficient of 0.35 and one-sided analyses because of the directional nature of the expected relationships of the study variables.

Phase 3: Qualitative Research

After finalizing the survey, a brief qualitative study was conducted with the purpose of further elaborating the quantitative findings and exploring barriers and facilitators for risk behaviors. Participants were selected from among the respondents of the quantitative survey, by inviting those who had expressed interest in sharing their opinions and participating in discussions. Thirty-three CSWs from Yerevan participated in this phase, including 25 focus group participants (four groups with 5–8 participants each) and eight key informant interviewees. Each session lasted approximately 1–2 h. Textual data collected through qualitative research was analyzed by identifying respondents' answers to questions.

Results

Participant Demographics and History of Sex Work

The mean age of the quantitative study participants was 30.5 years (range 18–43). Educational level was relatively high with 78% indicating having completed high school; however, the educational level of participants from Gyumri was lower than those from Yerevan and Ashtarak combined, $t(96) = 2.923$, $P < .01$. Fifty-seven percent had never been married but 21% indicated being in a committed relationship and 44% had children (mean = 1.6 children; range 1–3). The mean age of initiation of sex work was 22.7 years (range 14–37) with representatives of Gyumri reporting younger age of initiation compared to two other cities combined, $t(94) = 2.122$, $P < .01$.

A higher educational level was associated with older age of initiation of sex work ($r = .33$, $P < .01$), lower frequency of alcohol use ($r = -.32$, $P < .01$), lower frequency of physical abuse during the last month ($r = -.21$, $P < .05$), higher frequency of condom use with casual ($r = .26$, $P < .01$) and regular ($r = .29$, $P < .01$) clients, better condom negotiation skills with casual ($r = .27$, $P < .01$) and regular ($r = .26$, $P < .05$) clients, and higher self-efficacy/sexual assertiveness ($r = .24$, $P < .05$).

Condom Use During Penetrative Vaginal Sex

The proportion of condom-protected episodes of penetrative vaginal sex with their last three sex partners within the past week was 75% for casual clients, 66% for regular clients, and 13% for personal partners. Sixty-one percent reported *always* using condoms with casual clients, 47% with regular clients, and 24% with personal partners. The participants who reported *always* using condoms with a given type of sexual partner reported also 100% condom use in all encounters with the same type of partner from among their last three sex partners from the past week. Seventy-two percent reported that they perceived their personal partners to have a negative attitude toward condom use and 39% reported the same with regard to their clients, both, casual and regular. Higher frequencies of condom use with casual and regular clients were associated with lower number of reported STIs ($r = -.33$, $P < .01$ and $r = -.31$, $P < .01$ for casual and regular clients, respectively), lower frequency of alcohol use before sex work within the last week ($r = -.39$, $P < .01$ and $r = -.44$, $P < .01$, respectively), lower frequency of drug use ($r = -.65$, $P < .01$ and $r = -.64$, $P < .01$, respectively), lower frequency of physical abuse ($r = -.58$, $P < .01$ and $r = -52$, $P < .01$, respectively), higher condom negotiation skills ($r = .71$, $P < .01$ and $r = .65$, $P < .01$, respectively), higher sexual assertiveness/self-efficacy ($r = .69$, $P < .01$ and $r = .68$, $P < .01$, respectively), older age of the participant ($r = .33$, $P < .01$ and $r = .33$, $P < .01$, respectively), and older age of initiation of sex work ($r = .33$, $P < .01$ and $r = .40$, $P < .01$, respectively). The majority of respondents relied on their partners to provide condoms; 79% relied on their partners to put on the condoms, and 36% (all of them from Yerevan and Ashtarak) reported condom tear/slippage within the last week.

HIV Risk Behaviors

The proportion of respondents who reported having engaged in anal sex within the last month was 28%, all of them from Yerevan and Ashtarak. Of those who engaged in anal sex, 41% never used condoms. The

total number of reported episodes of anal sex within the last month was 199, of which only 16.2% were condom-protected. The higher frequencies of anal sex were associated with more frequent alcohol use before sex ($r = .44$, $P < .05$), more frequent lifetime drug use ($r = .61$, $P < .01$), more frequent abuse during the last month ($r = .40$, $P < .05$), lower frequencies of condom use during vaginal sex with casual ($r = -48$, $P < .05$) and regular ($r = -.47$, $P < .05$) clients, lower condom negotiation skills with both types of clients ($r = -.45$, $P < .05$ for both), and lower sexual assertiveness/self-efficacy ($r = -.50$, $P < .01$). Women who were more likely to report condom use during anal sex had a lower frequency of alcohol ($r = -.50$, $P < .01$) and drug ($r = -.51$, $P < .05$) use, older age of initiation of sex work ($r = .53$, $P < .01$), higher comfort in condom negotiation with casual ($r = .42$, $P < .05$) and regular ($r = .49$, $P < .01$) clients, positive personal attitudes to condoms ($r = .46$, $P < .05$), positive perceived personal partner attitude to condoms ($r = .80$, $P < .05$), and more frequently reported condom use during vaginal sex with casual ($r = .53$, $P < .01$) and regular ($r = .53$, $P < .01$) clients. Fifty-two percent of study participants reported having acquired an STI during their lifetime and 21% had an STI within the past 3 months. Syphilis and gonorrhea were the most commonly reported diagnoses. The self-reported number of STIs was associated with higher frequency of alcohol use prior to sex in general ($r = .29$, $P < .01$) and in the past week ($r = .33$, $P < 01$), higher frequency of being forced to use alcohol within the last week ($r = .23$, $P < .05$), and lifetime non-injection ($r = .26$, $P < .01$) and injection ($r = .37$, $P < .01$) drug use.

Injection drug use was reported by 19% of study participants (all of them from Yerevan) and 18% (again, all from Yerevan) reported having had at least one partner with a history of injecting drug use. One third of study participants had experience with non-injection drug use (all of them from either Yerevan or Ashtarak). Approximately half of the women reported using alcohol prior to sex during the past week. Twenty-four percent reported that they had been forced to use alcohol by their partner prior to intercourse. Lower frequencies of alcohol use prior to sex during the last week were associated with better condom negotiation skills with casual ($r = -.58$, $P < .01$) and regular ($r = -.56$, $P < .01$) clients as well as with permanent partners ($r = -.51$, $P < .05$), higher self-efficacy/sexual assertiveness ($r = -57$, $P < .01$), favorable personal ($r = -32$, $P < .05$) and perceived partner (both casual and personal, $r = -.50$, $P < .05$ and $r = -.35$, $P < .05$, respectively) attitudes to condoms, and older age of initiation of sex work ($r = -.48$, $P < .01$). Lower frequencies of drug use were associated with higher personal risk perception ($r = -.71$, $P < .01$), better condom negotiation skills with casual and regular clients ($r = -.71$, $P < .01$ for both) as well as with personal partners ($r = -.30$, $P < .01$), higher self-efficacy/sexual assertiveness ($r = -.71$, $P < .01$), favorable personal ($r = -56$, $P < .01$) and perceived personal partner attitudes to condoms ($r = -58$, $P < .01$), and older age of initiation of sex work ($r = -.56$, $P < .05$).

HIV/AIDS Knowledge

Although 92% of the respondents correctly identified the main modes of HIV transmission and 88% stated that there currently is no cure for AIDS, the majority of study participants indicated several misconceptions. These included that HIV can be transmitted through kissing (79%), sharing kitchen items (57%), and sharing a toilet (55%). The majority of the women stated that withdrawal before ejaculation, taking antibiotics, or contraceptive pills could protect them from HIV infection. Another common misconception was that by appearance alone, one can recognize his/her partner's HIV status (53%).

Structural Equations Modeling of Condom Use Intentions

The intention to engage in a behavior is a strong predictor of an actual behavior (Fisher & Fisher, 1992). A structural equations model using commercially available software was used to model condom use intentions and to understand the relative associations between several risk factors or behaviors and the intention to use a condom. Constructs of interest included HIV/AIDS knowledge, attitudes regarding condom use, perception of personal risk for acquiring HIV, perceived comfort negotiating condom use with partners, and substance (alcohol and drugs) use. For each predictor construct and the construct of condom use intentions, relevant items from the survey, which were significantly correlated ($P < .05$) and loaded on the same factor in a factor analysis, were considered in the structural equations model. For most of the constructs of interest, responses regarding casual clients, regular clients, and partners were available. However, none of the individual items for partners loaded on the respective factors and thus only responses regarding casual and regular clients were included in the model. Further, respondents from all three geographic locations were combined and included in the model since, despite differences on some survey responses across

sites, none of the items used specifically in the structural equations model were significantly different by group.

Variables with more than 10% missing values were excluded, resulting in a sample size of 78. For the remaining missing cases, a mean substitution method was used (between 1 and 6 data points for variables with missing values received a mean imputation). Although HIV/AIDS knowledge was initially included in the model, the construct was subsequently dropped due to a weak relationship between this variable and the intention to use a condom. Dropping the pathway between the HIV/AIDS construct and the intentions to use condoms increased the overall Comparative Fit Index from .73 to .94, suggesting a substantially improved overall fit between the data and the proposed model (See Fig. 1 for the hypothesized model).

The results of the final structural equations model using robust methods are displayed in Table 1, Fig. 2. Table 1 displays the individual item standardized solutions for each construct and their associated R^2 statistics. Figure 2 displays the standardized path coefficients between the four independent constructs explaining condom use intentions. Several model fit indices suggest that the observed data fit the hypothesized model: CFI (Robust): 0.983; Satorra–Bentler Scaled Chi-Square: 86.9972, df: 72; RMSEA: 0.046. All four of the hypothesized paths between constructs of interest and intentions to use condoms were significant, including attitudes toward condom use, personal risk perception, comfort negotiating condom use, and substance use. The relative strengths of the coefficients suggest the strongest association between comfort negotiating condom use and actual intentions, with the weakest association between personal risk perception and condom use intentions.

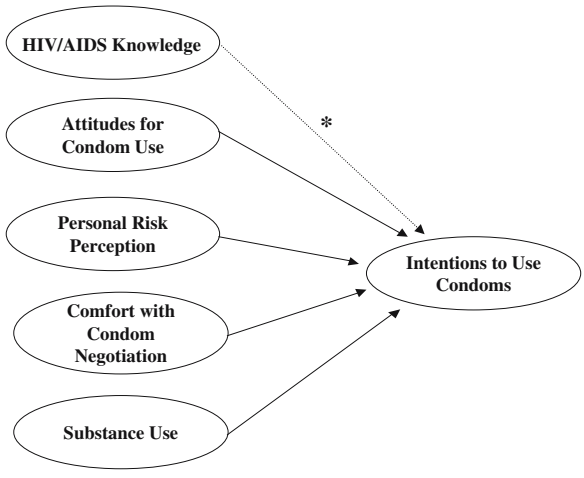

Fig. 1 Hypothesized structural equations model predicting condom use intentions. *Pathway dropped from final model

Findings of FG Discussions and in-depth Interviews

The qualitative research demonstrated that the participants of the survey may have over-reported the condom use with all types of partners and under-reported risk factors such as alcohol and drug use as well as history of STIs. Additionally, participants reported that a major barrier to condom use was their clients' negative attitudes towards them. Finally, another important finding of the qualitative study was that the majority of Armenian CSWs lacked condom use skills and were unaware that condoms might be of different quality or have an expiration date.

Discussion

To our knowledge, this is the first study to measure condom use and its correlates among Armenian female CSWs. Our data suggests that CSWs do not consistently use condoms with clients and that condom use rates are even lower with personal partners.

Women who answered *always* to condom use with a particular type of partner, also reported 100% condom use with that type of partner from among their last three sexual encounters. However, the qualitative research suggested that condom use was over-reported in the survey. Among the possible explanations for this discrepancy is the fact that focus groups participants stated that during the past 2 years, different organizations had distributed considerable number of condoms to CSWs. One can hypothesize that if a CSW had received free condoms, she would feel compelled to report that she was using them. In reality, however, as the focus group respondents stated, condom use with all types of partners was low. Quantitative and qualitative findings suggested that the main barrier to consistent condom use was the negative attitude of men toward condoms. The majority (72%) of survey respondents answered that their personal partners did not like sex with condoms and 39% stated that their clients did not like sex using condoms. In order to have sex without a condom, men abuse women physically or emotionally, offer more money for services, or use other methods to entice CSWs to engage in unprotected sex. Given these findings, it is clear that it would be extremely difficult for CSWs to negotiate condom use with clients who are willing to pay more or who may be abusing them. Infrequent condom use with personal partners on the other hand is due to fear of disrupting intimacy. The interviewees stated that CSWs wanted to feel like ''regular women,'' at least with their personal partners. These findings suggest

Table 1 Standardized factor loadings from final model solution and respective proportion of variance explained (R^2)

Construct	Items	Standardized loading factor	R^2
Attitudes toward condom use	Personal attitudes about condom use	.576	.332
	Perceived attitudes of partner about condom use	.267	.072
Personal risk perception	Risk of HIV: sex without condoms with casual client	.976	.953
	Risk of HIV: sex without condoms with permanent client	.987	.974
	Risk of HIV: withdrawal method with casual client	.484	.234
	Risk of HIV: withdrawal method with permanent	.530	.281
	Perceived personal risk of HIV infection in general	.259	.067
Comfort negotiating condoms	Difficulty discussing condom use with casual clients	.972	.944
	Difficulty discussing condom use with permanent clients	.978	.957
Substance use	Forced alcohol use prior to sex in past week	.607	.369
	History of non-IV drug use	.751	.565
	History of IV drug use	.811	.658
	Frequency of alcohol use prior to sex	.697	.486
Intentions to use condoms	Degree of confidence for condom use with next casual client	.981	.962
	Degree of confidence for condom use with next permanent client	.955	.912

that for CSWs there is a distinction between clients and partners and that the barriers for condom use are different depending on the type of sexual partner.

Despite the existence of condom distribution programs by NGOs, the majority of CSWs relied on their partners to provide condoms and to put them on. This may explain the considerably high proportion of condom failure (tear/slippage) reported by study participants. Condom failure could also be due to lack of skills to properly use them. These findings demonstrate that future interventions should pay special attention to condom use skill building.

The study demonstrated that a considerable proportion of Armenian CSWs engaged in anal sex and that condoms were rarely used. This finding was significant since anal sex, though considerably risky for HIV infection, is one that is least studied sexual behaviors in Armenia.

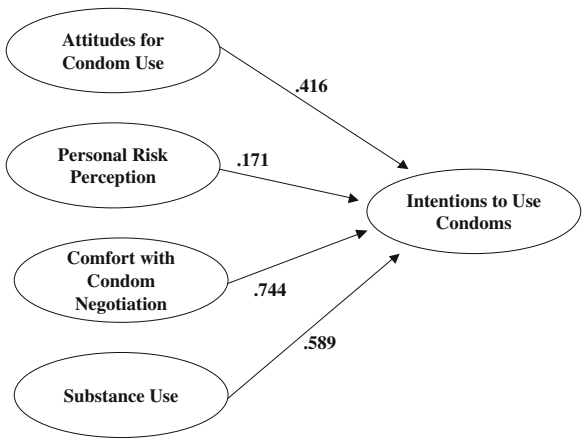

Fig. 2 Final solution of structural equations model. Standardized coefficients of model constructs explaining intentions to use condoms

Another important study finding was that a considerable proportion of respondents reported that they injected drugs themselves or that their sexual contacts were injection drug users. The proportions obtained in this study exceed the ones found in previous studies (Grigoryan et al., 2002, Shatvoryan, 2001), suggesting that, like in other former Soviet Union countries, injection drug use is also increasing in Armenia.

Alcohol use prior to sexual activity was reported to be common. As it has been previously reported, non-injection drug and alcohol use, although not directly risky in terms of HIV transmission, increases the likelihood of high-risk sexual behavior and decreases the frequency of condom use (Gordon & Carey, 1996). The findings of our study on the association of higher frequencies of alcohol and drug use with lower frequencies of condom use and higher frequencies of STIs confirm findings from prior studies.

The correlation analyses demonstrated that all high risk behaviors, as well as STI status were strongly associated with each other. They were all also negatively associated with condom use. In a structural equations model, personal and perceived attitudes regarding condom use, condom use negotiating skills, history of substance use, and perceived personal risk for HIV infection were all significantly associated with the intention to use condoms. The relative contributions of each to condom use suggest that condom negotiating skills have the highest correlation while personal risk has the lowest, with substance use and attitudes having relatively moderate effects. These findings suggest that teaching CSWs condom negotiating skills may be a priority, especially if time and resources are limited. Furthermore, it is possible that personal risk perceptions resulted in weak associations

because much of what factored into a perception of personal risk is based on one's knowledge of what is and is not a risk factor for HIV transmission. HIV/AIDS knowledge alone was not predictive of condom use intentions or actual condom use in this study.

This study suggests that risk behaviors differ across studied cities. CSWs residing in Yerevan were more at-risk than the ones from Ashtarak and Gyumri. There are three possible explanations for the latter finding. First, Gyumri, one of the cities heavily damaged by the 1988 earthquake, has been the site of numerous international donor-based public health programs including an HIV prevention project among CSWs. Second, in smaller cities, where people are more likely to know each other, CSWs may try to provide their services in a socially desirable way which may decrease HIV risk behaviors. Finally, the majority of CSWs from Gyumri (63%) compared to 21% of CSWs from the other two cities had a steady sexual partner.

Finally, our data suggests that risk behaviors differ across educational levels of participants. CSWs with a lower educational level engage in more risky behaviors compared to those with a higher educational level. Thus, a future intervention should take this finding into consideration and be developed for individuals with low literacy.

The study has several limitations. First, the sample size was small and the study participants were chosen through convenience sampling which could have biased the results. Second, some distrust of the researchers was noted during the course of the data collection, which could possibly impact the findings. However, if this did occur, respondents were likely to have responded in a socially desirable manner or have withheld information rather than over-reported risky behaviors. For this reason, we believe that the study findings may be an underestimation of the true level of risk present in this population.

In conclusion, this study characterized HIV risk factors among female CSWs in three cities in Armenia. Our data provided pilot estimates of the prevalence of HIV risk and preventive behaviors and identified some prominent misconceptions regarding HIV transmission, prevention and clinical manifestations of AIDS. The results of this study suggest that among Armenian CSWs, HIV knowledge does not translate into protective behaviors, including condom use. The latter are associated with personal and psychosocial factors including risk perception, educational level, condom negotiation skills and attitudes, as well as with substance use. Understanding the role of these influences is critical in the design and implementation of much needed HIV prevention intervention programs tailored for Armenian female CSWs.

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