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HIV Infection and Risk Heightened Among Female Sex Workers Who Entered the Sex Trade as Adolescents in Guatemala

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Abstract

A dearth of empirical research exists on female sex workers in Central America who begin selling sex under age 18. Data were collected from adult female sex workers (N = 1216) sampled using census and modified time-location sampling in three urban centers of Guatemala. In adjusted analyses, female sex workers who entered the sex trade under age 16 years were more likely to be HIV positive (AOR = 4.6, 95% CI 1.6, 13.2), have not received HIV education in their first year of sex trade (AOR = 2.8, 95% CI 1.5, 5.5), have experienced violence to force commercial sex (AOR = 4.6, 95% CI 2.2, 9.8) and have not used condoms in their first month (AOR = 2.8, 95% CI 1.3, 6.1), relative to those who entered as adults. An interaction between age at entry and foreign migration at entry was found for HIV risk. Efforts to prevent adolescent sex trade entry are needed and may also help to reduce HIV rates in Guatemala.

Resumen

Existe una escasez de investigaciones empíricas sobre mujeres trabajadoras sexuales en Centroamérica que inician en el trabajo sexual antes de los 18 años. Se colectaron datos de trabajadoras sexuales adultas (N = 1216) usando un censo y muestreo de tiempo y lugar modificado, en tres centros urbanos de Guatemala. El análisis de datos ajustado mostró que las trabajadoras sexuales que iniciaron en el trabajo sexual a través de trata de personas antes de los 16 años de edad tuvieron una mayor probabilidad de ser VIH positivas (AOR = 4.6, 95% CI = 1.6, 13.2), no haber recibido educación sobre el VIH en el primer año de trabajo sexual (AOR = 2.8, 95% CI = 1.5, 5.5), y haber sido forzadas con violencia para hacer trabajo sexual (AOR = 4.6, 95% CI = 2.2, 9.8) y no usar condones (AOR = 2.8, 95% CI = 1.3, 6.1) en el primer mes, en comparación con aquellas que iniciaron el trabajo sexual cuando ya eran adultas. Encontramos

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Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (University of California, San Diego School of Medicine, FWA00004495) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

una interacción entre la edad de inicio en el trabajo sexual y la migración al extranjero relacionado con el riesgo de infección por el VIH. Es necesario reforzar los esfuerzos para prevenir la trata de personas para el trabajo sexual, especialmente el ingreso de las mujeres menores de edad además ayudaría en la reducción de tasa de infecciones del VIH en Guatemala.

Keywords

Central America; HIV risk; Adolescent sex trade; Migrant sex workers; Violence

Introduction

Globally, female sex workers who begin trading or selling sex under age 18 are at heightened risk for violence, coercion, HIV, and sexually transmitted infections (STI) [1–5]. In particular, the period immediately after entering the sex industry may be an especially vulnerable context for minors [1, 6]. In multiple regions of Asia, Africa, and in Mexico, female sex workers (FSW) who entered the sex trade as minors report experiencing high levels of violence, particularly to force commercial sex, as well as multiple forms of sexual risk (e.g., high volume of male clients, no condom use, severe injury to the vaginal tract) in the first month of sex trade, greatly increasing their risk for HIV infection and STI [1, 3, 6, 7]. A representative study of adult FSW in Mexico found that more than one in four entered the sex industry as minors and those that did had three times the odds of HIV infection and of experiencing violence to coerce sex work, compared to those entering as adults [6]. A dearth of empirical research exists on the risks related to adolescent sex trade entry for other parts of Latin America [8].

In Guatemala, where there is an HIV prevalence of 0.8% among those aged 15–49 years [9], the HIV/AIDS epidemic is considered stable but concentrated in high risk populations, similar to the situation in Honduras and El Salvador [9–12, 12, 13, 13]. Sex workers in Guatemala experience one of the highest rates of HIV infection [9]. The epidemic in Guatemala continues to be monitored through the Integrated Bio-Behavioral Surveillance (IBBS) system [9], which estimated 1.1% of FSW in Guatemala City, 3.7% in Escuintla, and 2.0% in San Marcos were HIV positive in 2012/13 [14]. Clinic-based estimates of HIV rates among FSW has shown local variance across regions of Guatemala, ranging from 0.4% to 5.8%, with the highest rates detected on the Guatemala-Honduras border where the proportion of immigrant FSW is highest [15]. No rigorous research to date, however, has assessed the prevalence of adolescent sex trade in Guatemala and little is known about their specific vulnerabilities, particularly around HIV infection and violence [16].

Adolescent sex trade is described as a major and growing concern for Guatemala and other Central American countries based on high levels of organized crime and gender-based violence [17, 18]. UNICEF and the International Commission Against Impunity in Guatemala estimate that there are anywhere between 39,500 and 237,100 individuals being exploited in Guatemala's sex trade, 57% of whom are estimated to be children and adolescents [17]. This lack of empirical data on the prevalence of adolescent sex trade in

Central America and globally is considered to be a major barrier to development of effective HIV prevention programs and policies [19]).

Across Central America, the number of unaccompanied youth migrating across the region has increased over 400% between 2009 and 2014, a period that is relevant to the present research, reported to be a result of high levels of violence and income disparity [20]. Qualitative reports suggest that migrant women and girls face heightened vulnerability to poor health, including to HIV, gender-based violence, and sexual exploitation [16, 21, 22]. Poor Guatemalan and other Central American women and girls are often encouraged to migrate, either domestically or internationally, via legitimate or non-legitimate promises of formal work [23, 24]. Once migrated, they are held captive or preyed upon during their disorientation and/or economic vulnerability and forced to sell sex without pay [25, 26]. While migrant FSW in low income countries, compared to non-migrants, have been shown to be at greater risk for HIV infection and STI, few quantitative studies to date have assessed how migration status may affect the vulnerability of adolescent girls to entering the sex trade, or how migrant status at the time of entry may interact with young age to heighten risk for violence and HIV in the context of the sex industry [16, 23, 27].

Utilizing the first data in the region on sex trafficking, violence and HIV infection from a probability sample of FSW, the current study aims to provide estimates of the prevalence of adolescent sex trade among adult FSW in urban settings of Guatemala. We also aim to provide representative estimates of HIV prevalence and HIV-related health risks in this sample, including condom use, lack of HIV education, and violence to force sex work immediately following entry into the sex industry. Additionally, we seek to illuminate how these vulnerabilities relate to migrant status. These data are essential to understanding the extent to which adolescents are involved in the sex trade in Guatemala, the unique risks they face, and to inform strategies to reduce risk for these girls, one of the most marginalized populations in Guatemala.

Methods

Data Collection

FSW (n = 1216) were sampled across three major areas in Guatemala, including Guatemala City (n = 618) and urban centers of the departments of Escuintla (n = 301) and San Marcos (urban centers: Malacatán and Tecún Umán) (n = 297), as part of the 2012–2013 Guatemala Integrated HIV Bio-Behavioral Surveillance (IBBS) survey, a standardized HIV surveillance system used for higher risk populations. Guatemala City is the national capital and major source of economic opportunity, drawing internal and external migrants. San Marcos, northwest of the capital, lies on the border with Mexico and is a known economic and transport center, with a high number of sex work venues. Escuintla, southwest of the capital, is crossed by a major international transit route and, due to agricultural activity, is a large destination for male migrant workers. Reports of violence against sex workers are common in these regions [23, 28]. Participant eligibility criteria included being 18 years of age or older, reporting exchanging sex for money in the last 12 months, living or working at a study site, and providing written informed consent. Data collection was conducted over a period of five months between 2012 and 2013.

Participants were recruited from a total of 142 venues. Census sampling was used to select venues in the departments of Escuintla and San Marcos; the universe of sex work venues ($n = 87$) in these smaller urban centers was mapped and recruitment was conducted at all venues. In Guatemala City, modified time-location sampling was used to select venues due to the larger number of existing venues. Of the 177 identified venues in Guatemala City that met inclusion criteria (i.e., venues that provided approval for participation, were open for business, and safe for data collectors to visit), a subset of 56 were randomly selected, with probability of selection proportional to venue size (i.e., number of sex workers present) (PPS). Random replacement venues were selected if the originally selected venue was not available for data collection when revisited. Of the 56 selected venues, 55 venues participated and one venue ultimately refused participation. Venues included fixed sites of sex work (i.e., bars, *casa cerradas* [closed houses], clubs, restaurants, hotels/motels) and open sites (streets and parks) where sex work was conducted. All sex workers at selected venues were recruited via repeat visits and ultimately 66.2% of enumerated sex workers at venues agreed to participate.

Interviews were conducted at the study sites using ACASI (audio computer-assisted self-interview), a computer and audio-based system that has shown to reduce biases related to face-to-face interviews, particularly for sensitive subjects [29]. Study instruments were developed and piloted based on standard IBBS instruments, including a sexual behavior questionnaire and biological samples for HIV and STI testing. The questionnaire was modified to include retrospective assessments of age and health risk factors at the time of entry into sex work, including migration at entry, experiences of violence, and HIV-related risk (e.g. use of condoms in first month of sex work, client volume, participation in HIV informational or educational activities in first 12 months). The ACASI interview was implemented in a safe and private space at the study site, and participants were provided with an opportunity to stop the interview and seek counseling support if they felt uncomfortable with any questions (e.g., abuse or mistreatment questions).

At the time of the interview, venous blood samples (14 ml) were provided for HIV testing according to the national Guatemalan algorithm for HIV screening. Two rapid tests in parallel, Alere GmbH (Köln, Germany) Determine® HIV-1/2 and ACON HIV 1/2/0 Tri line (Alere), were conducted in local survey sites. In pregnant women DPP® rapid test (Chembio Diagnostic Systems, Inc.) was performed at the local survey site. If results were uniformly positive or negative on both tests, results were reported to the participant during post-test counseling. Subsequently HIV positive samples were confirmed by enzyme-linked immunosorbent assay (ELISA for HIV-1/2 Ab-Ag, fourth generation) at the Guatemalan Ministry of Health National Health Laboratory. Samples with discordant results were evaluated with Western blot (Bio-Rad Laboratories) at the National Health Laboratory. People diagnosed with HIV were referred to care clinics for results from confirmatory or discordant tests, further evaluation, and treatment. All participants received educational materials about HIV/STIs, test results, and condoms as appreciation for participating in the study.

Study protocols were approved by the Institutional Review Boards/Ethics Committees of the Guatemalan Ministry of Health, Hospital Roosevelt, and the University of the Valley,

Guatemala, the U.S. Centers for Disease Control and Prevention, and the University of California, San Diego School of Medicine.

Data Analysis

The primary independent variable of interest, age at entry into sex work, was constructed as self-reported age at first exchange of sex for money or goods and categorized as entry at less than 16 years old, 16–17 years old, or 18 years old and above. We used this categorization to separately capture sex work entry during early adolescence, late adolescence, and at or after the age of majority in order to assess a gradient of vulnerability based on age group and to inform age group-specific practical application of results. The secondary independent variable of interest was migration at time of entry into sex work (“When you started sex work, did it happen at the same time that you migrated from one place to another?”); foreign migration (response option: “It happened to me when I was trying to move from one country to another”), internal migration within Guatemala (response option: “It happened to me when I was trying to move from one city to another within the same country”), and no migration (response option: “No, at that time I was not moving from one place to another to live”).

The four dependent variables hypothesized a priori to relate to minor age and migration at entry to sex work were 1) violence victimization to force commercial sex during the first month of sex trade, 2) no condom use during the first month of sex trade, 3) no HIV education in the first year of sex trade, and 4) current HIV infection. The two dependent variables occurring in the first month of sex trade aim to capture acute vulnerability to HIV-related risk behaviors immediately upon entering the sex trade that may increase subsequent vulnerability to HIV, as has been observed in other contexts [1, 6]. Violence during the first month of sex trade was measured by the question, “During the first month you were in sex work, how frequently did someone use violence or force to make you have sexual relations or do something sexual with male clients?” and responses were dichotomized as “any violence” for responses that indicated frequent, some, or rare violence vs. “no violence” due to the public health significance of experiencing any violence to force sexual relations [30, 31]. Condom use during the first month of sex trade was measured by the question, “During the first month in sex work, how frequently did you use condoms with male clients?” and dichotomized as, “Used condoms with male clients” for responses that indicated frequent, some, or rare use vs. “Never used condoms with male clients”. HIV education was measured by the dichotomous question, “During the first 12 months of receiving money in exchange for sexual relations, did you participate in informational or educational activities about HIV/AIDS?” Current HIV infection was determined by results of biological testing.

Socio-demographic covariates included current age, education (no formal education, at least some primary, at least some secondary, and more than secondary), country of birth (Guatemala, other), and city of interview. Covariates also included lifetime history of injection drug use (“At any time in your life, have you injected illegal drugs?”) and condom use in the past 30 days (“During the last 30 days, how frequently did you use condoms with all of your clients?”) dichotomized as “Consistently used condoms” (“always”) vs. “Inconsistently used condoms” (“sometimes” or “never”). While duration of sex work may

also be an important covariate, it was not explicitly included in the models because “age at entry” and “current age” are both in the model and together, capture duration of sex work. Introducing duration of sex work in the model would create multi-collinearity between these three variables.

Unweighted and weighted percentages are provided for demographic descriptions of the total sample. All multi-variable analyses were conducted utilizing weighted data to account for the PPS sampling method utilized in Guatemala City. Weights were only applied for participants recruited in Guatemala City; weights were calculated based on the response rate for each type of venue and individual selection probabilities. Participants from Escuintla and San Marcos were, effectively, given a weight of one.

Descriptive statistics were generated for all variables, for both the total sample and by outcome variable. For categorical socio-demographic and dependent variables, a Rao-Scott Chi-Square test was used to evaluate their association with the independent variables of interest (age at entry into the sex trade and migration at entry). The Rao-Scott Chi-Square test was developed as an adjusted statistic from Pearson’s Chi-Square in order to account for the impact of complex survey design when analyzing categorical variables [32]. For continuous socio-demographics and dependent variables, ANOVA was utilized to evaluate their associations with age at entry into the sex trade and t-tests were utilized to evaluate their associations with migration at entry.

Unadjusted logistic regression models further described the relationship between both age at entry into sex work and migration status at entry and the four key outcomes of interest. Adjusted logistic regression models included current age, education, and city of interview. The adjusted model for HIV status also included lifetime injection drug use and condom use in the past 30 days. Significance was evaluated at $p < 0.05$. Post-hoc analyses to explore the statistical interaction between age at entry and migration at entry were conducted for each outcome; interaction terms were deemed significant at an alpha level of $p < 0.20$ [33]. Interaction models included age at entry, migration at entry, and the interaction term of these two variables. All analyses were conducted using SAS® software [34].

Results

Sociodemographics

Of 1,216 participating FSW, 18.2% were under 18 years old and 8.5% were under age 16 years old at entry to the sex industry (Table 1). Those who entered under 18 years old were younger at the time of data collection (mean 27.7 for < age 16 vs. 25.7 for 16–17 years and 29.3 for 18 + years). Those who entered under age 16 years old more commonly reported having no education compared to the two older groups (44.4% vs. 13.9% for 16–17 years and 13.0% for 18 + years). For over half of participants (53.7%), five years or less had passed between entering the sex trade and participating in this study (mean: 6.8 years; standard deviation: 6.7 years; median: 5 years). For nearly one third of participants (32.3%), only two years or less had passed.

Among all participants, 22.8% were migrants, 14.4% were internal migrants and 8.4% were foreign migrants. Among foreign migrants, 9.2% were under age 16 and 6.7% were ages 16–17 at entry. Among internal migrants, 9.0% were under age 16 and 10.0% were ages 16–17 at entry. Internal migrants, relative to foreign and non-migrants, reported the highest levels of lifetime injection drug use (1.2%) and inconsistent condom use in the last 30 days (9.5%).

HIV Positive Status and HIV-Related Risk

FSW who entered the sex trade under age 16 years experienced elevated levels of HIV infection and HIV-related risks compared to their counterparts who entered at older ages. Among those who entered under age 16, 4.6% were HIV positive, compared to 0.9% of those entering the sex trade at 18 years or older. In their first month in the sex trade, 25.9% experienced violence to force commercial sex (vs. 7.7% among those entering at 18 years or older) and 19.6% did not use condoms during this same initial period (vs. 7.3% among those entering at 18 years or older). Additionally, 76.5% received no HIV education in the first year of sex trade (vs. 50.8% among those entering at age 18 years or older). In adjusted analyses, adolescent girls who entered the sex trade under age 16 years were more likely to be HIV positive (adjusted odds ratio (AOR) = 4.6, 95% confidence intervals (CI) 1.6, 13.2; Wald Chi-Square test statistic: 13.9, $p < 0.001$), to have not received HIV education in their first year (AOR = 2.8, 95% CI 1.5, 5.5; Wald Chi-Square test statistic: 10.7, $p = 0.005$), to have experienced violence to force commercial sex (AOR = 4.6, 95% CI 2.2, 9.8; Wald Chi-Square test statistic: 21.0, $p < 0.001$) and to have not used condoms (AOR = 2.8, 95% CI 1.3, 6.1; Wald Chi-Square test statistic: 7.9, $p = 0.020$) in their first month of sex trade relative to those who entered the sex trade as adults (Tables 2 and 3).

Among FSW who entered the sex trade between ages 16–17 years, 4.8% were HIV positive, 61.3% received no HIV education in the first year of sex trade, 16.9% experienced violence to force commercial sex and 5.7% did not use condoms in the first month of sex trade. In adjusted analyses, adolescents who entered the sex trade at ages 16–17 years were more likely to be HIV positive (AOR = 5.9, 95% CI 2.0, 17.7; Wald Chi-Square test statistic: 13.9, $p < 0.001$) and to have experienced violence to force commercial sex in their first month (AOR = 2.9, 95% CI 1.5, 5.7; Wald Chi-Square test statistic: 21.0, $p < 0.001$) relative to those who entered as adults.

Regarding experiences of migration, those migrating from another country (foreign migrants) had higher odds of experiencing violence to force commercial sex in the first 30 days of sex trade (20.8% vs. 9.6%) in both unadjusted (odds ratio (OR) = 2.5, 95% CI 1.3, 4.6; Wald Chi-Square test statistic: 9.4, $p = 0.009$) and adjusted models (AOR = 2.3, 95% CI 1.1, 4.7; Wald Chi-Square test statistic: 7.6, $p = 0.0221$), relative to FSW not migrating (Tables 2 and 3).

The interaction between age at entry and foreign migration at entry was found to be significant in three models: No condom use in the first month of sex trade ($p < 0.001$), not receiving HIV education in the first month of sex trade ($p = 0.046$) and HIV infection ($p < 0.001$). The interaction term was not statistically significant for violence to force commercial sex in the first month of sex trade (Table 4).

FSW who were under the age of 16 years were more likely to not use condoms in the first month of sex work, compared to those aged 18 years or more, if they were migrating internally (AOR 6.7, 95% CI 1.5, 29.5) or not migrating (AOR 3.2, 95% CI 1.3, 8.0) (Table 4).

Among FSW who were foreign migrants at the time of entry into sex work, the odds of not receiving HIV education in the first year were higher among those who entered at less than 16 years of age (AOR = 34.2, 95% CI 3.8, 312.2) relative to those who entered at age 18 or older. Among FSW who did not migrate, those who entered under age 16 years had higher odds of receiving no HIV education in the first year (AOR = 2.9, 95% CI 1.4, 6.2) than those who entered at age 18 or older, but this was not true for those ages 16–17 years (Table 4).

Among those participants who entered the sex trade as adults, the adjusted odds of being HIV positive were 6.8 (95% CI 1.9, 24.0) times higher for foreign migrants relative to non-migrants. Among those who entered the sex trade as minors, the adjusted odds of being HIV positive were lower for those migrating (either foreign or internal) compared to those not migrating; however, this is likely attributable to the fact that no HIV positive participants in this sample who entered the sex trade as minors were also migrating. In the subgroup of those who were not migrating at the time of entry, however, those who entered as minors had higher odds of being HIV positive than those entering as adults (< 16 years, AOR = 12.0, 95% CI 3.2–45.0; 16–17 years, AOR = 7.6, 95% CI 2.2–26.1) (Table 4).

Discussion

In the current representative study of FSW in three urban regions in Guatemala, those who entered the sex trade as minors were five to six times more likely to be HIV positive, compared to those entering as adults, demonstrating the high health risks faced by this vulnerable population. These results suggest that entering the sex trade as a minor may put these girls on a life trajectory of higher risk for HIV, whether related to immediate experiences of violence and HIV risks or to experiences they encounter later on. In this sample, 5% of those who entered the sex trade under age 18 were HIV positive, compared to < 1% of those entering as adults and 1.1–3.7% estimated by the 2012/13 IBBS for the general FSW population in these same urban centers [14]. In the only other similar study of this kind in Latin America, FSW who entered the sex trade as minors in two Mexican cities along the U.S.-Mexico border were found to be three times as likely to be infected with HIV [6]. The more extreme results found in the current study highlight the severe vulnerability experienced by girls entering the sex trade as early adolescents in Guatemala. Moreover, these findings underscore that reducing HIV-related vulnerability among adolescents in the sex trade is critical to the success of national HIV prevention efforts in Guatemala.

The current findings are consistent with similar studies conducted in other global contexts. In this probability sample of FSW, almost one in five entered the sex trade under age 18 and one in 12 prior to age 16, proportions comparable to those found among a representative sample of FSW in Northern Mexico [6]. Consistent with findings from Mexico and multiple regions in South Asia, women who entered the sex trade at the youngest ages reported being placed at high risk for HIV immediately upon entering; compared to adult entrants,

those who entered under age 16 were five times as likely to experience violence to force sex work, and three times as likely to have not used condoms and to have not received HIV education [2, 3, 6]. These findings confirm what has been found in other settings: the period immediately following adolescent entry to the sex trade is a particularly vulnerable time, especially in terms of HIV-related risk, above and beyond vulnerability experienced by adult entrants, the impact of which may linger throughout their lives [2, 3, 6, 8]. More research is needed to understand if this critical period of vulnerability extends beyond the first month after entry. As identifying and conducting health interventions with adolescents who have just recently begun exchanging sex is extremely difficult, these findings illuminate the importance of preventing adolescent sex trade before it occurs, including intervening with adolescents who are at high risk for sex trade [26, 35]. While Guatemala's legal system offers some of the most stringent laws against trafficking and sexual exploitation of minors in the region, these results highlight the need to strengthen systems for the enforcement of these laws and to focus national efforts on prevention [36, 37].

Going beyond previous studies of this kind, the present study provides empirical evidence on the way migration at time of entry changes the association of age at entry with HIV status and related risk factors. More than one in five FSW in these urban areas of Guatemala were migrants at the time of sex trade initiation, the majority of which were internal migrants. Among both foreign migrants and non-migrants, those entering the sex trade prior to age 16 had higher adjusted odds of not receiving HIV education during their first year relative to those entering as adults. Additionally, among FSW who entered the sex trade as adults, those migrating at the time of entry experienced 6.8 times the likelihood of being HIV positive compared to those who were not migrating at the time of entry. As previous research in Mexico and Guatemala has suggested, migrating at the time of starting sex trade, whether as an adolescent or adult, can lead to vulnerability to violence, abuse, and disconnection from resources, including HIV information [23, 24].

Unexpectedly, though, the present results indicate that simultaneously being a minor and foreign migrant at entry did not interact to heighten the odds of being HIV positive. This finding may primarily reflect that our sample had limited numbers of minor migrant entrants who were HIV positive or it may offer a clue that migrant children may be experiencing the sex trade differently than non-migrant children and migrant adults. It may be that migrant children are specifically recruited by particular networks and/or taken to particular venues that are tightly controlled, which may include rules around condom usage or other protections against HIV, yet are isolated from health information [38]. This finding could also indicate that foreign migrants entering the sex trade as minors into riskier, more hidden sex trade networks may not be adequately represented in this study; they may continue to be part of hidden sex trade networks or were transferred internationally and not accessible for recruitment into this study. Those that have the opportunity to escape these networks and afterward work in public sex work venues are likely more represented in the results of this study. More research is needed to understand how the elevated risk for HIV and sexual violence experienced by minors entering the sex trade are affected by migration status.

Limitations

The results of this study should be interpreted with consideration of several limitations. While the sampling methods used were intended to generate a representative sample of FSW from three urban centers of Guatemala, results of this study are not generalizable to any other context. Additionally, FSW who enter the sex trade as minors may be an especially hard-to-reach population, and the venues they work at may be more likely to refuse participation, leading them to be under-represented in this sample. No FSW who were currently minors were included in the sample; therefore, data in this analysis are retrospective reports of events in childhood and adolescence from adult FSW and they may be subject to self-report and recall biases. Collecting data from adolescents who are currently sex trafficked, while possibly reducing recall bias, is ethically questionable and presents extreme challenges in identifying this hidden population. Adjusted analyses in this study controlled for current age of participant to help account for bias in recall. While there is a strong temporal component to how the independent and dependent variables were measured, these results represent cross-sectional data and the temporal ordering of the independent and dependent variables cannot be certain.

Conclusions

The current study found that in urban Guatemala, entry to the sex trade as a minor is common among FSW and that one in 20 who enter prior to age 18 are currently infected with HIV. Vulnerability to HIV begins immediately after entry, including violence, condom non-use, and limited access to HIV education. Given that adolescents who enter the sex trade are difficult to reach, primary prevention of adolescent sex trade is crucial to protecting these girls and reducing HIV among FSW in Guatemala [4, 24, 35, 39]. Previous research in Mexico identifying adolescent pregnancy, childhood sexual violence, and child marriage as risk factors for adolescent sex trade may provide relevant insight regarding opportunities for primary prevention of adolescent sex trade in Guatemala [35]. More research to better understand risk factors for adolescent sex trade specific to Guatemala, particularly when migration is co-occurring, and more primary prevention efforts addressing these risk factors are needed. Additionally, social and health services designed to specifically support and reduce HIV vulnerability among FSW who have entered the sex trade as adolescents are needed to interrupt the HIV risk trajectory associated with adolescent entry.

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Table 1

Sample characteristics and associations with age and migration status at entry into sex work among female sex workers in Guatemala (n = 1216)

	Total sample (N = 1216)	Age at entry			Migration at entry			Test statistic ^b
		Unwtd % (n)	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a	
Sample characteristics								
Current age								
Mean (SD)	28.7 (7.6)	29.5	27.7 (7.9)	25.7 (7.5)	29.3 (7.5)	29.7 (7.0)	28.0 (7.2)	28.8 (7.7)
				14.0***			1.5	
Education								
No formal education	14.2 (173)	15.8	44.4	13.9	13.0	15.3	21.2	14.8
At least some primary	50.3 (612)	54.0	44.7	64.2	53.7	43.0	64.9	53.2
At least some secondary	23.4 (285)	20.2	10.4	17.5	21.5	23.9	9.8	21.7
More than secondary	12.0 (146)	10.0	0.5	4.4	11.7	17.8	4.0	10.2
				64.6***			4.0	
Country of birth								
Guatemala	72.6 (883)	76.5	75.5	79.1	76.3	14.5	95.8	20.2
Other country	27.4 (333)	23.5	24.5	20.9	23.7	85.5	4.2	10.2
				0.3			129.5***	
Study city								
Escuintla	24.8 (301)	12.4	13.1	17.0	11.8	6.9	2.6	14.9
San Marcos	24.4 (297)	12.3	11.1	10.6	12.6	33.4	38.9	4.9
Guatemala City	50.8 (618)	75.3	75.8	72.3	75.6	59.7	58.6	80.2
				3.8			61.4***	
Lifetime injection drug use								
Any	0.8 (10)	0.5	2.6	0.4	0.3	.05	1.2	0.4
None	99.2 (1204)	99.5	97.4	99.6	99.7	99.5	98.8	99.6

	Total sample (N = 1216)	Age at entry			Migration at entry			Test statistic ^b
		Total sample (Wtd N = 2412)	< 16 years (Wtd % = 8.5; unwtd n = 96)	16–17 years (Wtd % = 9.7; unwtd n = 126)	18 + years (Wtd % = 81.7; unwtd n = 992)	Foreign migration (Wtd % = 8.4; unwtd n = 123)	Internal migration (Wtd % = 14.4; unwtd n = 189)	
	Unwtd % (n)	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a	Wtd % ^a
Condom use in past 30 days			10.0 ^{**}	10.0 ^{**}	13.1 ^{**}			
Inconsistent	2.4 (28)	2.9	0.5	1.5	3.3	1.5	9.5	1.8
Consistent	97.6 (1144)	97.1	99.5	98.5	96.7	98.5	90.5	98.2
Outcomes				3.6			10.0 ^{**}	
Violence ^c	10.5 (127)	10.1	25.9	16.9	7.7	20.8	6.6	9.6
No condom use ^c	7.4 (90)	8.1	19.6	5.7	23.1 ^{***}	7.9	6.2	8.5
No HIV education ^d	47.6 (576)	54.1	76.5	61.3	9.3 [*]	41.3	59.4	54.5
HIV positive	2.4 (29)	1.6	4.6	4.8	14.2 ^{**}	2.9	2.3	1.3
				15.3 ^{**}			1.7	

Results presented are weighted to account for sampling design

SD standard deviation, *Unwtd* unweighted; sample weights not used, *Wtd* weighted; sample weights used to account for probability of selection proportional to venue size (PPS) methodology

* p < 0.05,

** p < 0.01,

*** p < 0.001

^a Percentages may not sum to 100 percent due to rounding

^b Rao-Scott Chi-Square for categorical and T-Test (t value)/ANOVA (F-value) for continuous variables

^c Within first month of sex work

Within first year of sex work_p

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Table 2
Unadjusted associations of age at entry into sex work and migration at entry into sex work with risks after entry into sex work and current HIV among female sex workers in Guatemala (N = 1216)

	Violence ^a (Wtd % = 10.1) OR (95% CI) Test statistic ^c	No condom use ^a (Wtd % = 8.1) OR (95% CI) Test statistic ^c	No HIV education ^b (Wtd % = 54.1) OR (95% CI) Test statistic ^c	HIV positive (Wtd % = 1.6) OR (95% CI) Test statistic ^c
Age at entry into sex work				
< 16 years	4.2 (2.1–8.5)	3.1 (1.4–6.9)	3.1 (1.6–6.1)	5.2 (1.6–16.5)
16–17 years	2.5 (1.3–4.8)	0.8 (0.2–2.5)	1.5 (0.9–2.6)	5.5 (1.9–16.2)
18 years	Ref	Ref	Ref	Ref
	19.7***	9.0*	13.0**	13.9**
Migration at entry				
Foreign migration	2.5 (1.3–4.6)	0.9 (0.3–2.7)	0.6 (0.4–0.97)	2.2 (0.8–6.6)
Internal migration	0.7 (0.2–1.8)	0.7 (0.3–1.6)	1.2 (0.7–2.2)	1.7 (0.5–6.4)
No migration	Ref	Ref	Ref	Ref
	9.4**	0.6	5.2	2.4

Results presented are weighted to account for sampling design

Wtd/weighted; sample weights used to account for probability of selection proportional to venue size (PPS) methodology. OR odds ratio, CI confidence interval, ref/reference category

* p < 0.05,

** p < 0.01,

*** p < 0.001;

Bold formatting of OR (95% CI) indicates statistical significance based on 95% CI

^aWithin first month of sex work

^bWithin first year of sex work

^cWald Chi-Square (p value)

Table 3

Adjusted associations of age at entry into sex work and migration at entry into sex work with risks after entry into sex work and current HIV among female sex workers in Guatemala (N = 1216)

	Violence ^a (Wtd % = 10.1)	No condom use ^a (Wtd % = 8.1)	No HIV education ^b (Wtd % = 54.1)	HIV positive (Wtd % = 1.6)
	AOR (95% CI) ^c	AOR (95% CI) ^c	AOR (95% CI) ^c	AOR (95% CI) ^d
	Test statistic ^e	Test statistic ^e	Test statistic ^e	Test statistic ^e
Age at entry into sex work				
< 16 years	4.6 (2.2–9.8)	2.8 (1.3–6.1)	2.8 (1.5–5.5)	4.6 (1.6–13.2)
16–17 years	2.9 (1.5–5.7)	0.8 (0.2–2.6)	1.5 (0.9–2.6)	5.9 (2.0–17.7)
18+years	Ref	Ref	Ref	Ref
	21.0 ***	7.9 *	10.7 **	13.9 ***
Migration at entry				
Foreign migration	2.3 (1.1–4.7)	0.7 (0.2–2.3)	0.7 (0.4–1.2)	2.9 (0.9–9.6)
Internal migration	0.6 (0.2–1.7)	0.5 (0.2–1.1)	1.3 (0.6–2.7)	1.7 (0.3–9.2)
No migration	Ref	Ref	Ref	Ref
	7.6 *	2.9	3.2	3.1
Current age (continuous)	0.999 (0.996–1.001)	1.001 (0.999–1.002)	1.02 (0.99–1.05)	1.001 (1.0–1.003)
	1.0	0.4	1.8	2.1
Education				
No formal education	0.7 (0.3–1.5)	2.5 (0.8–8.2)	2.8 (1.5–5.3)	3.9 (0.4–36.7)
At least some primary	0.4 (0.2–0.9)	1.7 (0.6–5.1)	2.6 (1.5–4.4)	2.9 (0.4–23.9)
At least some secondary	0.7 (0.3–1.5)	2.4 (0.5–11.2)	1.8 (0.995–3.3)	2.4 (0.2–23.7)
More than secondary	Ref	Ref	Ref	Ref
	6.0	2.7	14.5 **	1.6
Study city				
Escuintla	0.8 (0.5–1.4)	0.8 (0.4–1.6)	0.6 (0.5–0.9)	4.0 (1.5–10.6)
San Marcos	1.3 (0.7–2.5)	2.5 (1.2–5.1)	0.6 (0.4–0.95)	1.6 (0.4–6.6)
Guatemala City	Ref	Ref	Ref	Ref
	1.8	11.2 **	8.3 *	8.3 *
Lifetime Injection Drug use				

	Violence ^a (Wtd % = 10.1)	No condom use ^a (Wtd % = 8.1)	No HIV education ^b (Wtd % = 54.1)	HIV positive (Wtd % = 1.6)
	AOR (95% CI) ^c	AOR (95% CI) ^c	AOR (95% CI) ^c	AOR (95% CI) ^d
	Test statistic ^e	Test statistic ^e	Test statistic ^e	Test statistic ^e
Any	-	-	-	2.8 (0.2–37.3)
None	-	-	-	Ref
Condom use in past 30 days				0.6
Inconsistent	-	-	-	3.9 (0.7–20.4)
Consistent	-	-	-	Ref
				2.5

Results presented are weighted to account for sampling design

Wtd/weighted; sample weights used to account for probability of selection proportional to venue size (PPS) methodology, AOR adjusted odds ratio, CI confidence interval, ref reference category

* p < 0.05,

** p < 0.01,

*** p < 0.001;

Bold formatting of AOR (95% CI) indicates statistical significance based on 95% CI

^aWithin first month of sex work

^bWithin first year of sex work

^cModel adjusted for age, education, study site

^dModel adjusted for age, education, study site, lifetime injection drug use, and condom use in the past 30 days

^eWald Chi-Square (p value)

Adjusted associations for interaction effect of age at entry into sex work and migration of entry into sex work for risks after entry into sex work and current HIV status among female sex workers in Guatemala (N = 1216)

Table 4

Interaction term	p value	Violence ^a	No condom use ^a	No HIV education ^b	HIV
		0.21	< .001	0.046	< .001
		AOR (95% CI)^{c,d}	AOR (95% CI)^{c,d}	AOR (95% CI)^{c,d}	AOR (95% CI)^{c,d}
Foreign migration					
< 16 years		1.5 (0.2–10.6)	0.6 (0.1–6.3)	34.2 (3.8–312.2)	< .001 (< .001—< .001)
16–17 years		4.6 (0.9–23.1)	< .001 (< .001—< .001)	2.5 (0.5–13.5)	< .001 (< .001—< .001)
18+		Ref	Ref	Ref	Ref
Internal migration					
< 16 years		18.8 (2.8–127.4)	6.7 (1.5–29.5)	1.6 (0.3–8.5)	< .001 (< .001—< .001)
16–17 years		0.8 (0.1–7.7)	3.0 (0.4–26.4)	0.4 (0.1–1.4)	9.4 (0.9–101.8)
18+		Ref	Ref	Ref	Ref
No migration					
< 16 years		3.8 (1.8–8.4)	3.2 (1.3–8.0)	2.9 (1.4–6.2)	12.0 (3.2–45.0)
16–17 years		2.6 (1.2–5.7)	0.6 (0.2–2.6)	1.9 (1.0–3.4)	7.6 (2.2–26.1)
18+		Ref	Ref	Ref	Ref
< 16 years					
Foreign migration		1.1 (0.1–7.9)	0.2 (0.02–2.1)	5.8 (0.6–55.8)	< .001 (< .001—< .001)
Internal migration		2.2 (0.3–14.0)	1.1 (0.3–5.0)	0.8 (0.2–4.3)	< .001 (< .001—< .001)
No migration		Ref	Ref	Ref	Ref
16–17 years					
Foreign migration		4.9 (1.0–25.3)	< .001 (< .001—< .001)	0.7 (0.1–3.7)	< .001 (< .001—< .001)
Internal migration		0.1 (0.02–1.2)	2.6 (0.2–29.1)	0.3 (0.1–1.0)	3.2 (0.3–29.9)
No migration		Ref	Ref	Ref	Ref
18+ years					
Foreign migration		2.8 (1.4–5.8)	1.2 (0.4–3.8)	0.5 (0.3–0.9)	6.8 (1.9–24.0)
Internal migration		0.5 (0.2–1.1)	0.5 (0.2–1.3)	1.5 (0.7–3.0)	2.6 (0.6–11.8)
No migration		Ref	Ref	Ref	Ref

Bold formatting of AOR (95% CI) indicates statistical significance based on 95% CI Results presented are weighted to account for sampling design

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AOR adjusted odds ratio, *CI* confidence interval, *ref* reference category

^a Within first month of sex work

^b Within first year of sex work

^c Model includes age at entry into sex work, migration at entry into sex work, and interaction term

^d *AORs* for comparison between 16 and 17 years and < 16 years not included in table