Author Manuscript

HHS Public Access
Author manuscript
J Ethn Subst Abuse. Author manuscript; available in PMC 2021 December 02.

Published in final edited form as:
J Ethn Subst Abuse. 2020 ; 19(4): 503–520. doi:10.1080/15332640.2018.1556763.

The influence of migration in substance use practices and HIV/STI-related risks of female sex workers at a dynamic border crossing

Teresita Rocha-Jiménez[a,b], **Sonia Morales-Miranda**[c,d], **Carmen Fernández-Casanueva**[d], **Kimberly C. Brouwer**[a,e]

[a]Division of Infectious Diseases and Global Public Health, University of California San Diego, La Jolla, California;

[b]Graduate School of Public Health, San Diego State University, Center for U.S.- Mexican Studies, University of California, San Diego, California;

[c]Consorcio de Investigación sobre VIH SIDA TB CISIDAT, Cuernavaca, Morelos, México;

[d]Centro de Investigaciones y Estudios Superiores en Antropología Social CIESAS, San Cristóbal de las Casas, Chiapas, México

[e]Department of Family Medicine and Public Health, University of California San Diego, La Jolla, California

Abstract

We explored the association of international migration with substance use and HIV/STI risk factors among female sex workers (FSW). Using modified time-location sampling, we recruited 266 FSW at the Mexico-Guatemala border. Crude and adjusted logistic regression models were used to evaluate the relation- ships. HIV risks, such as frequent hard drug use and drug use in another country, were greater for migrant compared to non- migrant FSW. However, more migrant versus nonmigrant FSW reported consistent condom use with clients and having a health card. Our study highlights regional patterns of sub- stance use among FSW and risk or protective behaviors related to migration status.

Keywords

Substance use; HIV; international migrants; sex work; Mexico- Guatemala border ç

Introduction

Migration has been linked to increased anonymity, disconnection from cultural norms, and economic and social vulnerability, which in turn has been associated with risk behaviors, such as sexual risk taking (Deane et al., 2010; Goldenberg et al., 2012; Infante et al., 2009; Smith, 2016). Isolation, structural barriers (e.g., irregular migration status, constant

‘Declarations of interest: none’

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

mobility[1]) may affect migrants' health by increasing the likelihood of certain risk behaviors, such as substance use (Brouwer et al., 2009; Zimmerman et al., 2011).

Over the past decade, illicit substance use has increased considerably in border regions and along migration routes in Latin America (Bucardo et al., 2005). This is especially visible in the Mexico-Guatemala border region, which has a key geographical position as a major transit point for migration from South and Central America to northern countries (United Nations Office on Drugs and Crime, 2015). This region is also a key location for the sex trade (Bronfman et al., 2004). Previous research conducted in the region has found that some of the drivers of migration to this border include community violence (e.g., gang and drug-related violence), violence from intimate partners, and a desire to improve their socio-economic status and to help their families in their home country (Rocha-Jiménez, 2016b). Engagement in sex work after migrating was found to be a result of social and structural impacts including economic hardship post-migration, limited access to other employment opportunities as well as the anonymity provided by working outside's their home community (Febres-Cordero et al., 2018; Rocha-Jiménez et al., 2016).

The overlap between rising substance use, sex work, and a highly mobile population at the Mexico-Guatemala border might have implications on risk behaviors and disease transmission throughout the region and warrants further exploration. Social norms in the sex trade dictate that sex workers often are compelled to use substances (i.e., alcohol and drugs) with clients before or after having sex (Harcourt & Donovan, 2005); pimps or bar managers often enforce such rules in specific sex work venues (e.g., formal, indoor venues such as bars, nightclubs, discotheques, and brothels) (Hong & Li, 2008; Yang et al., 2005).

Substance use in the workplace by sex workers may lead to unsafe sexual practices, such as high client volume to pay for drugs or difficulty negotiating condom use with clients (Conners et al., 2016; Shannon & Csete, 2010; Shannon et al., 2008). Consequently, sex workers who report heavy drug use have been more likely to report STI (sexually transmitted infections) symptoms than sex workers who do not use drugs (Surratt, 2007). Migrant sex workers may be at particularly high risk of substance use within the workplace due to vulnerability associated with their undocumented status and the stressors associated with migration (Li et al., 2010; Surratt, 2007). Research conducted in multiple settings (e.g., Thailand, U.S., China) have found that migrant sex workers are more likely to report alcohol use (Li et al., 2010; Surratt, 2007) than non-migrants, and that alcohol use can impair their ability to negotiate condom use with clients (Ford & Chamratrithirong, 2008).

While local substance use has increased tremendously over the past decade in the Mexico-Guatemala border region, little information is available on the possible intersection of sex work, migration, and substance use in this key geographical region. Exploration of such intersections may have implications beyond the border to other regions of Latin America. The objective of this study is to gain understanding of the role of international migration on substance use and related risks for HIV/STI among female sex workers working at the

[1]In the Mexico-Guatemala context mobility entails local and regional mobility for the purpose of different activities such as temporary work, buying goods, and using drugs. It may also entail cross border commuting.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Mexico-Guatemala border. Based on the literature and on the previous research conducted in the region, we hypothesized that international migrant will have higher odds of increased substance use as well as sexual risk behaviors in the context of sex work in comparison with their non-migrant counterparts. Structural (e.g., income, type of sex work venue) and social variables will be also taken into consideration to inform and interpret this study's analysis. The present analysis may help inform and improve prevention programs, and highlight migration in the context of substance use and sex work.

Methods

Study Setting and Procedures

From September 2013 to July 2015, we recruited actively practicing female sex workers as part of a cross-sectional study within a larger NIH-funded study (*Cruzando Fronteras*) of substance use and HIV risk. Using a combination of modified time-location sampling of different sex work venues (e.g., bars, street) and peer referral, participants were recruited in the border cities of Ciudad Hidalgo and Tapachula in Mexico and Tecún Umán and Quetzaltenango in Guatemala. Due to their geographic location and relative economic prosperity, these cities represent key sites for both internal and international migration flows and the sex trade (Campos-Delgado & Odgers-Ortiz, 2012; Morales-Miranda et al., 2013).

Eligibility criteria for the study included: a) Being biologically female, b) using illicit substances including cocaine, crack, heroin, inhalants, amphetamines, tranquilizers, and the combination of these substances in any mode of administration (beyond marijuana by itself) in the past 2 months, c) having reported exchanging sex for money, drugs or goods in the last month, d) 18 years old or older, e) Spanish speaker, f) willing and able to provide informed consent, g) willing to undergo on site HIV testing. Upon written consent, trained interviewers conducted face-to-face interviews to obtain information on sociodemographics, substance use practices, occupational related factors and migration experiences. Interviews were conducted in private rooms (i.e., study offices) and lasted approximately 50–80 minutes. Participants were compensated $10 USD in in-kind goods for completing the interview and testing, and $5 USD for returning to receive their HIV test results.

This project was approved by the Human Research Protections Program (IRB) of the University of California, San Diego; the Bioethics Committee of the University of Valle, Guatemala; and the Bioethics Committee of the Institute of Health of the State of Chiapas, Mexico.

Measures

For the purpose of this analysis, we used the International Organization of Migration definition which considers an international migrant any person who has moved across an international border away from his/her habitual place of residence (International Organization for Migration, 2004; International Organization of Migration, 2018). The rest of the participants are local residents or internal migrants, which encompass the non-migrant category for this analysis.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Dependent Variables

Alcohol and Drug Use

Alcohol Use: The Alcohol Use Disorders Identification Test Consumption (AUDIT-C) was used to assess problem drinking (Bradley et al., 2007). Categorical variables were created to reflect hazardous drinking for women: a) drinking more than 4 times per week, b) drinking more than 7 drinks on a typical day, and c) drinking 4 or more drinks on one occasion weekly or more often.

Substance Use: Participants were asked if they have ever used drugs and how often during the last 6 months they used a certain drug. Dichotomous categories for substance use to reflect type and frequency of use were created. For analysis purposes, hard drug use included the use of: cocaine, crack, or heroin in any mode of administration (Cross et al., 2001; Golub & Johnson, 2001). Marijuana, inhalants, amphetamines, and tranquilizers were excluded from this definition but still were reported if relevant use of them was found.

Drug and alcohol use in the context of sex work was measured by asking participants how often they used drugs or drank alcohol immediately before or after having sex with a client in the past 30 days (ever/never).

Sexual Risks

Violence in the workplace: Participants were categorized as having experienced workplace violence if they reported being: robbed, kidnapped, injured, threatened with murder by a client; been forced or coerced into having sex or engaging in a sexual activity against their will with a client, past 6 months (Fawole & Dagunduro, 2014; Semple et al., 2015).

Pay a pimp or manager: We created a dichotomous variable for having to currently pay a pimp or manager a percentage of their earnings (yes/no).

Client Volume: We created a variable that captured participants who reported having more than 20 new clients in the past 30 days (based on 75th percentile).

Type of work venue: Venues were categorized as formal venues (e.g., bars, nightclubs, discotheques) and informal venues (street, *cantinas*, closed houses[2], hotels). This was based on ethnographic fieldwork indicating that formal venues are 'visible'; sex workers need to have a health card, are subject to authorities' inspections, and usually have a pimp, manager, or an owner in charge. Whereas informal venues are clandestine and sometimes far from the tolerance zones and women find their own clients and the place (e.g., hotel, streets) where they exchange sex. Women were asked about some characteristics of the work venue such as if people are using or selling drugs (yes/no).

[2]For the purpose of this paper, closed houses are defined as a clandestine space, usually a big house, where women exchange sex with men. Its clandestine nature can be explained by the illegality of the activities that usually happen in this space (i.e. substance use, adolescents and girls exchanging sex) and the will to maintain its activities as discrete as possible (i.e. residential area vs. commercial areas).

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Health Card: Participants were asked if they had an updated/current health card (yes/no). It is important to note that in both countries, women who engage in sex work in formal venues need to undergo to periodical HIV/STI testing to maintain a health card (Ministerio de Salud Pública y Asistencia Social Guatemala, 2012; Rocha-Jiménez, 2016a). It is important to mention that in Tecún Umán and Quetzaltenango, health permits are provided free of charge through community health clinics. In Tapachula and Ciudad Hidalgo, obtaining a health card involves out-of-pocket fees and sometimes requires transportation to a clinic located in an isolated outlying area (Las Huacas, Tapachula) (Rocha-Jiménez, et al. 2018).

Condom use

Consistent Condom Use: Participants were asked how often they used condoms with regular and new clients in the past 30 days using a 5-point Likert scale ranging from always to never. Consistent condom use captures participants reporting always using condoms.

Access to condoms: This variable showed participants reporting having access to free condoms in their current workplace in the past 30 days (yes/no).

Data Analysis

Descriptive statistics were calculated to provide an overview of participants' demographics. Pearson Chi-Square or Fisher's Exact Test, for discrete variables, and Wilcoxon Rank Sum for non-parametric continuous variables, were used to assess variability between migrants versus non-migrants ($p<0.05$). Univariate logistic regressions were performed to identify factors associated with migration status. In the case of drug use, the analyses were restricted to the drugs that occurred in highest frequency among participants (crack, cocaine, crack and cocaine together, inhalants, methamphetamines, and tranquilizers). Variables significant at a $p<0.2$ cutoff were considered for inclusion in a final multivariable logistic regression model (Table IV) (Hosmer et al., 2013). To reduce multicollinearity, variables that were highly correlated with each other (an $r>0.4$) were not included in the same model; in the event of two highly correlated covariates, the one with the strongest association with the outcome was retained. Using a manual backwards procedure for model building, variables were removed from the model individually. Only variables significant at $p<0.05$ were retained in the multivariate model. All regression models are presented with crude and adjusted Odds Ratios, 95% confidence intervals, with any $p<0.05$ considered significant. All analyses used SPSS Statistics 21 Software (IBM, 2012).

Results

Characteristics of the Study Population

The median age of the sample was 27 years old and 29% were migrants according to our analytical definition (Table 1). Most participants (76%) reported not having an intimate partner, and 84% had children. Of those who reported having children, 79% had children <18 years old. Among those who were international migrants, 36% (n=28) were born in Honduras, 21% (n=16) in El Salvador, 17% (n=13) in Guatemala, 11% (n=8) in Mexico, and 1% (n=1) in Dominican Republic. A higher percentage of migrants (44%) reported not

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

practicing any religion compared to their non-migrant counterparts (30%). Nine out of 266 participants had a confirmatory HIV test (3.4%).

Forty two percent of the migrants reported having ever been deported, versus 9% among those who were not current migrants[3]. Moreover, 68% of the migrants reported exchanging sex for money for the first time in a different country than their origin country compared to 4% of the non-migrants. Similarly, 51% of migrants reported using an illicit drug for the first time in a foreign country, versus 3% of non-migrants. Migrants and non-migrants reported almost equal levels of education (40% of the total sample did not complete elementary school).

Migration Status and Associations with HIV/STI Risk Behaviors of Substance Using Female Sex Workers

Table 2 illustrates risk factors for HIV/STI acquisition by migration status. Amongst our substance using study population, univariate and unadjusted logistic regression demonstrated that migrants had increased odds of drinking 4 or more times per week than non-migrants. Unadjusted analyses also showed that migrant female sex workers had increased odds of lifetime hard drug use, past 6 months hard drug use, and weekly or more often hard drug use over the past 6-months compared to non-migrant sex workers.

We found that in the past 6-months, migrants were almost 8 times more likely to have used drugs in a different country, excluding the interview location (see Table 2). When asked the reasons why participants used drugs for the first time, 51% of the migrant participants responded that they did due to curiosity compared to 30% of non-migrant sex workers.

In terms of substance use in the context of sex work, we found that both groups reported drinking alcohol and using drugs with clients in the past month. However, migrant sex workers had significantly lower odds of drinking alcohol and using drugs in the context of sex work compared to their non-migrant counterparts (see Table 2). We explored some of the sex work venue characteristics and a higher percentage of non-migrants (9%) reported that they were required to drink alcohol with clients in comparison with 3% of the migrant sex workers, although this was not statistically significant.

Migrants and non-migrants reported using similar types of drugs (e.g., crack and marijuana, cocaine, inhalants, methamphetamines, and tranquilizers). However, we found that in general migrants reported more frequent use or had higher odds of ever using hard drugs (e.g., crack, cocaine). Migrants had 2.5 greater odds of smoking crack and marijuana together in the past 6-months and 3 times higher odds of smoking the combination weekly or more often. They also were more likely to have ever used cocaine and in the past 6 months, and to have ever used inhalants compared to non-migrant women sex workers (see Table 3).

[3]Participants who reported ever being deported were not necessarily considered to be current migrants because most of them came back to their country of origin and were currently living there. Additionally, we did not have information on when the most recent deportation occurred, so having a history of ever being deported was not considered equivalent to currently living in a foreign country as a migrant.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Migrant status and occupational related factors

Overall, migrants tended to work in more controlled environments than non-migrants, which offered both positive and negative influences on health. For instance, we found that migrants had almost two times higher odds of working in formal venues, (e.g., bars, discotheque, nightclubs) where safety measures are more often in place. For example, consistent condom use with clients was two times more likely to be reported among migrants than non-migrants (see Table 2). And although only 12% (n=31) of the total sample reported having a current health, migrant sex workers had 4.57 higher odds of having a health card than non-migrant sex workers.

These types of settings also came with risks, including a higher number of clients; migrants were 2.59 times more likely to have 20 new clients or more in the past month than non-migrant sex workers. Sixty percent of the migrant participants reported that there are people using drugs in their workplace and this was borderline statistically significant in comparison with non-migrant participants main workplace. However, when we analyzed alcohol use in the workplace, we found that a higher percentage of non-migrant reported being required to drink with clients than their migrant counterparts (Table 2).

Self-report of violence in the workplace or violence perpetrated by clients was not significantly different between groups (35% of the entire sample). And although not statistically different by group, it is important to note that free access to condoms in the workplace was low among the entire sample (27%).

Factors independently associated with Migration Status

In the multivariate model, we observed that some risk factors remained significant when comparing migrant and non-migrant sex workers. For instance, international migrants had significantly increased odds of substance use (OR = 7.37) in other countries during the past year (i.e., besides in the country where they currently live), a two-fold increase in the odds of weekly or more hard drug use, and two-fold increases in the odds of paying a pimp a percentage of earnings[4]. Although, some risk factors remained, migrant sex workers still had higher odds of more consistent condom use with clients when compared with non-migrant sex workers and a nearly three-fold increase in the odds of having a health card. We also observed that migrants who reported a history of substance use had a significantly lower odds of alcohol use with clients than non-migrants who also previously used illicit substances (Table 4). In univariate analysis, sociodemographic variables such as age, education, and civil status were not significant; therefore we did not adjust for those in the final model.

Discussion

We found differences in HIV risk behaviors and substance use patterns between substance using migrant sex workers compared to substance using non-migrant sex workers. Some of

[4]Unfortunately, we do not know if these managers or pimps were actually controlling or coercing participants to engage in specific behaviors (e.g., exchange sex for money) since we only asked if they paid a percentage of their earnings to someone in charge of their work venue.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

these findings are contrary to what we originally hypothesized before conducting the present analyses.

While migrants tended to engage in riskier substance use, outside the workplace, they reported higher levels of consistent condom use and owning a health card, which usually entails high levels of HIV/STI testing (Rocha-Jiménez et al., 2016a; Sirotin et al., 2010). Of concern, however, was that health card ownership overall was low (12%). A the time of data collection, there were crack-downs and raids in formal venues, specifically in Tapachula, that had as main consequences the closure of numerous venues (Febres-Cordero et al., 2018; Brigada Callejera de Apoyo a la Mujer, 2015). In other contexts where similar raids have happened, women are usually pushed to more clandestine and unsafe working environments (Rocha Jiménez, 2017; Brigada Callejera de Apoyo a la Mujer, 2015). This could have lead to participants not accessing to local health services as the health card entails self-identifying as a sex worker.

The occupational environment may play a key factor in understanding findings regarding HIV risk factors among migrant and non-migrant sex workers working in the Mexico-Guatemala border and may serve as a point of intervention to decrease risks for both groups. Substance use in the context of sex work is common, especially alcohol use in formal venues such as bars, clubs, and table dance halls (Chen et al., 2012; Li et al., 2010). We found high levels of alcohol use with clients among our overall sample of substance users, although significant lower levels among migrant sex workers. This is a different trend found in other studies conducted among migrant sex workers in other regions (Li et al., 2010; Surratt, 2007; Ford & Chamratrithirong, 2008). Migrant sex workers had higher odds of working in formal venues but when asked if they were required to drink alcohol with clients in their work venue, a higher percentage of them responded no (9% vs. 4%). In similar settings, such as Tijuana, Mexico, it has been found that managers or pimps in formal work venues water down the drinks of FSW to diminish the risks of drinking with male clients (Nowotny et al., 2017). Thus, to some extent, the type of venue and sex work context may partially explain some of the variations in behaviors between migrant and non-migrant sex workers in the Mexico-Guatemala border.

Consistent condom use among migrant sex workers was higher in comparison to their non-migrant counterparts (57% of migrants and 37% of non-migrants), however, still reflects a sizeable portion regularly engaging in unprotected sex. A substantial proportion of both migrant and non-migrant substance using sex workers reported not having access to free condoms in the workplace (27%). Therefore, sex workers who are consistently using condoms with clients are getting them elsewhere (e.g., clients bringing them). Further research to understand barriers to condom access and use, as well as campaigns that provide free condoms to vulnerable populations in the region, are needed. Client volume per month was higher among migrant sex workers in comparison with non-migrant; a combination of migrant risk perception and the characteristics of their main work venue (e.g., formal vs. informal, having a manager or a pimp, availability of substances) may be explaining why they reported consistent condom use (Wingwood & DiClemente, 2000). A number of studies in similar settings have found that working in formal venues (e.g., bars, table dance halls) may provide certain protective advantages (e.g., access to HIV/STI testing) (Hong & Li,

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

2008; Sirotin et al., 2010). For example, a study conducted in Tijuana, Mexico found that registered sex workers had decreased risky sexual behaviors (e.g., higher consistent condom use) (Gaines et al., 2013; Sirotin et al., 2010) compared to non-registered sex workers.

Mobility and migration play a key role in this study. An important percentage of migrants reported engaging for the first time in sex work in a foreign country (68%), 30% responded that this happened when they were trying to move to another place and that the first time they used illicit drugs was outside their home country (51%). Research conducted on substance use among migrants has found that anonymity and permissiveness are drivers to try drugs for the first time, which might be the case of this study's sample (Viruell-Fuentes, 2007, Padilla et al., 2012, Pinedo et al., 2012). Studies conducted among Mexican migrants in the United States have found high levels of substance use associated with stress, isolation, and occupational requirements (Haviland de León et al., 2016; Ortega et al., 2000). Nevertheless, a high proportion of non-migrants also reported use of cocaine in the past 6 months (60%); 14% reported ever using inhalants and 16% tranquilizers. These data reflect general drug use trends that have been rising in the region.

There is very limited literature about specific drug use in the Mexico-Guatemala border among vulnerable populations and its effects on health (Bronfman et al., 2004; Chen et al., 2012; Morales-Miranda et al., 2013; Uribe-Salas et al., 2003). Understanding what types of drugs are being used and in what context, can inform HIV/STI prevention programs and interventions (e.g., drug treatment) that considers the effects of these drugs and the consequences for the health of sex worker and clients (Infante et al., 2009; Morales-Miranda et al., 2013; Solís et al., 2004).

Social support and peer relationships may be another form of coping with isolation and occupational stress (see Table 2). A qualitative study conducted at the Mexico-Guatemala border among migrant sex workers found that peer support was more prevalent in formal venues and this entailed increased HIV/STI prevention knowledge and attendance to the local health clinic, sometimes together, (e.g., HIV/STI screening) than among women who were working in informal venues (Febres-Cordero et al., 2018). However, this same study found that establishing networks among their peers might be challenging due to high mobility. Further research should be conducted to understand why migrant women have higher odds of working in formal venues in comparison to non-migrant women and what are the broader implications for women's health and risk behaviors.

This study has several limitations. Because it is cross-sectional, we are not able to draw conclusions about causality. Therefore, it is difficult to determine if substance use among migrants is related to their current sex work venue, the migration journey, or previous experiences in their home country, although most substance use started after migrating (Bronfman et al., 2004; Zimmerman et al., 2011). In addition, behaviors such as substance use, which was not biologically tested, and condom use, may have been under-reported or over-reported due to social desirability bias. We also tried to shield some of the eligibility criteria to participate and we asked about drug use in many different ways while applying the screening tool. Because this study's sample was selected based on modified-time

location sampling, and purposely-recruited substance using FSW we cannot generalize findings to other populations of sex workers (Morales-Miranda et al., 2013)

Further research contemplating the particularities of internal migration, mobility, and the time in the destination site is needed. Additionally, other characteristics such as religion and local FSWs' characteristics in this context should be considered when interpreting research conducted in this region. It is possible that the experience of migration has an impact on religious practices over time and this could further explain other behavior modification among migrants (Massey & Higgins, 2011).

Moreover, exploring how participants' country of origin (e.g., Honduras, El Salvador) and ethnicity (e.g., indigenous) may explain specific vulnerabilities (e.g., substance use, psychiatric disorders) is recommended for future research conducted in the region. The findings of this study may inform regional public health policies that aim to understand substance use among vulnerable population such as sex workers, regardless their migration status, as well as to understand how the sex work venue may impact sexual behaviors and HIV/STI risk. Details provided by this study as well as the different nuances surrounding migration and sex work may inform future research on HIV and substance use among migrant and non-migrant sex workers in this region (Shannon et al., 2008; Rocha-Jiménez et al., 2016b; Bronfman et al., 2004; Zimmerman et al., 2011). Programs that target sex workers who engage in sex work in informal and outdoor venues and that consider migration experiences are needed.

Acknowledgments

The authors gratefully acknowledge the participants, community collaborators, and study staff in both Guatemala and Mexico. The authors are enormously grateful to Valerie Mercer from the University of California, San Diego, from her support. The first author (TR) was supported by the Consejo Nacional de Ciencia y Tecnolog_ıa, Mexico (CONACYT-UC Mexus 396237), and the Center for U.S.-Mexican Studies, University of California, San Diego, visiting fellowship. KB was supported by the San Diego Center for AIDS Research (P30 AI036214). The Crossing Borders Project was funded by the U.S. National Institutes of Health (NIDA R01DA029899, PI Kimberly Brouwer).

References

Bradley KA, DeBenedetti AF, Volk RJ, Williams EC, Frank D, & Kivlahan DR (2007). AUDIT-C as a brief screen for alcohol misuse in primary care. Alcohol Clin Exp Res, 31(7), 1208–1217. doi: 10.1111/j.1530-0277.2007.00403.x [PubMed: 17451397]

Brigada Callejera de Apoyo a la Mujer. (2015). Cálculo de Trabajadoras Sexuales que Laboran en Tapachula, Chiapas en la Actualidad. Brigada Callejera de Apoyo a la Mujer "Elisa Martínez", A.C. México, DF. https://en.calameo.com/read/000137394ef0fd5e7a21f

Bronfman M, Leyva R, & Negroni M (2004). Movilidad poblacional y VIH/SIDA. Contextos de vulnerabilidad en México y Centroamérica. Cuernavaca, Morelos, México: Instituto Nacional de Salud Pública.

Brouwer KC, Lozada R, Cornelius W, Cruz MF, Magis-Rodriguez C, De Nuncio MZ, & Strathdee S (2009). Deportation along the US–Mexico border: its relation to drug use patterns and accessing care. Journal of Immigrant and Minority Health, 11(1), 1–6. [PubMed: 18247117]

Bucardo J, Brouwer KC, Magis-Rodríguez C, Ramos R, Fraga M, Perez SG, … Strathdee SA. (2005). Historical trends in the production and consumption of illicit drugs in Mexico: implications for the prevention of blood borne infections. Drug and alcohol dependence, 79(3), 281–293. [PubMed: 16102372]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Campos-Delgado A, & Odgers-Ortiz O (2012). Crossing the Border: Mobility as a Resource in the Tijuana/San Diego and Tecún Umán/Tapachula Regions. Estudios fronterizos, 13(26), 9–32.

Chen NE, Strathdee SA, Rangel G, Patterson TL, Uribe-Salas FJ, Rosen P, … Brouwer KC. (2012). HIV risk behaviours differ by workplace stability among Mexican female sex workers with truck driver clientele. Journal of public health research, 1(3), 208.

Chen NE, Strathdee SA, Uribe-Salas FJ, Patterson TL, Rangel MG, Rosen P, & Brouwer KC (2012). Correlates of STI symptoms among female sex workers with truck driver clients in two Mexican border towns. BMC Public Health, 12(1), 1. [PubMed: 22214479]

Conners EE, Silverman JG, Ulibarri M, Magis-Rodriguez C, Strathdee SA, Staines-Orozco H, … Brouwer KC. (2016). Structural determinants of client perpetrated violence among female sex workers in two Mexico-US border cities. AIDS and Behavior, 20(1), 215–224. [PubMed: 26111732]

Cross JC, Johnson BD, Davis WR, & Liberty HJ (2001). Supporting the habit: income generation activities of frequent crack users compared with frequent users of other hard drugs. Drug and alcohol dependence, 64(2), 191–201. [PubMed: 11543989]

Deane KD, Parkhurst JO, & Johnston D (2010). Linking migration, mobility and HIV. Tropical Medicine & International Health, 15(12), 1458–1463. [PubMed: 20958895]

Fawole OI, & Dagunduro AT (2014). Prevalence and correlates of violence against female sex workers in Abuja, Nigeria. African health sciences, 14(2), 299–313. [PubMed: 25320578]

Febres-Cordero B, Brouwer KC, Rocha-Jimenez T, Fernandez-Casanueva C, Morales-Miranda S, & Goldenberg SM (2018). Influence of peer support on HIV/STI prevention and safety amongst international migrant sex workers: A qualitative study at the Mexico-Guatemala border. PLoS One, 13(1), e0190787. [PubMed: 29304164]

Ford K, & Chamratrithirong A (2008). Migrant seafarers and HIV risk in Thai communities. AIDS Education and Prevention, 20(5), 454. [PubMed: 18956985]

Gaines LT, Rusch LAM, Brouwer CK, Goldenberg MS, Lozada R, Robertson MA, … Patterson LT. (2013). Venue-level correlates of female sex worker registration status: A multilevel analysis of bars in Tijuana, Mexico. lobal Public Health, 8(4), 4015–4116. doi: 10.1080/17441692.2013.779386

Goldenberg S, Rangel G, Vera A, Patterson T, Abramovitz D, Silverman J, … Strathdee S. (2012). Exploring the Impact of Underage Sex Work Among Female Sex Workers in Two Mexico–US Border Cities. AIDS Behav, 16(4), 969–981. [PubMed: 22012147]

Goldenberg SM, Rivera Mindt M, Rocha Jimenez T, Brouwer K, Morales Miranda S, & Fisher CB (2015). Structural and interpersonal benefits and risks of participation in HIV research: Perspectives of female sex workers in Guatemala. Ethics & Behavior, 25(2), 97–114. [PubMed: 27840564]

Goldenberg SM, Strathdee SA, Perez-Rosales MD, & Sued O (2012). Mobility and HIV in Central America and Mexico: A critical review. Journal of Immigrant and Minority Health, 14(1), 48–64. [PubMed: 21789558]

Golub A, & Johnson BD (2001). Variation in youthful risks of progression from alcohol and tobacco to marijuana and to hard drugs across generations. American journal of public health, 91(2), 225. [PubMed: 11211630]

Harcourt C, & Donovan B (2005). The many faces of sex work. Sexually Transmitted Infections, 81(3), 201–206. [PubMed: 15923285]

Haviland de León I, Rocha Jiménez T, Lewin-Fishcher P, & Zúñiga ML (2016). What Price for Work and Friends? Occupation context, social networks, and substance use among Yucateco Migrants in the United States. In Cornelius AW., Gell-Redman M, Hillary KS, Lewin-Fishcher P & Noriega V (Eds.), The New Face of Mexican Migration: A Transnational Community in Yucatan and California (pp. 97–120). La Jolla, California: University of California, San Diego.

Hong Y, & Li X (2008). Behavioral studies of female sex workers in China: a literature review and recommendation for future research. AIDS and Behavior, 12(4), 623–636. [PubMed: 17694431]

Hosmer DW Jr, Lemeshow S, & Sturdivant RX (2013). Applied logistic regression (Vol. 398): John Wiley & Sons.

IBM. (2012). IBM SPSS Statistics for Windows. 2012.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Infante C, Aggleton P, & Pridmore P (2009). Forms and Determinants of Migration and HIV/AIDS-Related Stigma on the Mexican—Guatemalan Border. Qualitative Health Research, 19(12), 1656–1658. [PubMed: 19949216]

International Organization for Migration. (2004). Glossary on Migration. In International Organization for. Migration (Ed.), International Migration Law. Geneva, Switzerland

International Organization of Migration. (2018). Who is a migrant? World Migration Report 2018. Retrieved 04/05/2018, 2018, from https://http://www.iom.int/who-is-a-migrant

Li Q, Li X, & Stanton B (2010). Alcohol use among female sex workers and male clients: an integrative review of global literature. Alcohol and Alcoholism, 45(2), 188–199. [PubMed: 20089544]

Reglamento para la Prevención, Diagnóstico, Tratamiento y Control de las Infecciones de Transmisión Sexual (ITS) y el Virus de Inmunodeficiencia Humana (VIH), 57–2012 C.F.R. (2012).

Massey Douglas., Higgings M. (2011). The effect of immigration on religious belief and practice: A theologizing or alienating experience? Social Science Research, 40(5), 1371–1389. [PubMed: 23606773]

Morales-Miranda S, Álvarez-Rodríguez BE, Arambú N, Aguilar J, Huamán B, Figueroa W, … Castillo A. (2013). Encuesta Centroamericana de Vigilancia de Comportamiento Sexual y Prevalencia del VIH e ITS, en poblaciones vulnerables y poblaciones clave (ECVC). Publicacion UVG. No. 27. Guatemala: Universidad del Valle de Guatemala, MSPAS, HIVOS.

Nowotny KM, Cepeda A, Perdue T, Negi N, & Valdez A (2017). Risk Environments and Substance Use Among Mexican Female Sex Work on the US–Mexico Border. Journal of Drug Issues, 47(4), 528–542.

Ortega AN, Rosenheck R, Alegria M, & Desai RA (2000). Acculturation and the lifetime risk of psychiatric and substance use disorders among Hispanics. The Journal of nervous and mental disease, 188(11), 728–735. [PubMed: 11093374]

Padilla MB, Guilamo-Ramos V, Godbole R (2012). A syndemic analysis of alcohol use and sexual risk behavior among tourism employees in Sosua. Dominican Republic. Qual Health Res. 22(1), 89–102. [PubMed: 21859907]

Pinedo M, Campos Y, Leal D, Fregoso J, Goldenberg S, Zúñiga ML (2014). Alcohol use behaviors among indigenous migrants: a transnational study on communities of origin and destination. Journal of Immigrant and Minority Health, 16(3), 348–355. [PubMed: 24366542]

Rocha-Jiménez T, Brouwer KC, Silverman JG, Morales-Miranda S, & Goldenberg SM (2016a). Exploring the Context and Implementation of Public Health Regulations Governing Sex Work: A Qualitative Study with Migrant Sex Workers in Guatemala. Journal of Immigrant and Minority Health, 19(5), 1235–1244. doi: 10.1007/s10903-016-0399-x

Rocha-Jiménez T, Brouwer KC, Silverman JG, Morales-Miranda S, & Goldenberg SM (2016b). Migration, violence, and safety among migrant sex workers: a qualitative study in two Guatemalan communities. Culture, health & sexuality, 18(9), 965–979.

Rocha-Jiménez T, Brouwer KC, Salazar M, Boyce C, Servin A, Goldenberg SM et al. (2017). "He invited me and didn't ask anything in return" Migration and Mobility as Vulnerabilities for Sexual Exploitation among Female Adolescents in Mexico. International Migration, 56(2).

Rocha-Jiménez T, Morales-Miranda S, Fernandez-Casanueva C, Brouwer KC & Goldenberg SM (2018). Stigma and unmet sexual and reproductive health needs among international migrant sex workers at the Mexico–Guatemala border. International Journal of Gynecology & Obstetrics, 143(1). 10.1002/jigo.12441.

Semple SJ, Stockman JK, Pitpitan EV, Strathdee SA, Chavarin CV, Mendoza DV, … Patterson TL. (2015). Prevalence and correlates of client-perpetrated violence against female sex workers in 13 Mexican cities. PLoS One, 10(11), e0143317. [PubMed: 26599083]

Shannon K, & Csete J (2010). Violence, condom negotiation, and HIV/STI risk among sex workers. Journal of the American Medical Association, 304, 573–574. doi: doi:10.1001/jama.2010.1090 [PubMed: 20682941]

Shannon K, Kerr T, Allinott S, Chettiar J, Shoveller J, & Tyndall MW (2008). Social and structural violence and power relations in mitigating HIV risk of drug-using women in survival sex work. Soc Sci Med, 66(4), 911–921. [PubMed: 18155336]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Sirotin N, Strathdee SA, Lozada R, Abramovitz D, Semple SJ, Bucardo J, & Patterson TL (2010). Effects of government registration on unprotected sex amongst female sex workers in Tijuana; Mexico. International journal of drug policy, 21(6), 466–470. [PubMed: 20956076]

Sirotin N, Strathdee SA, Lozada R, Nguyen L, Gallardo M, Vera A, & Patterson TL (2010). A comparison of registered and unregistered female sex workers in Tijuana, Mexico. Public health reports, 125(Suppl 4), 101. [PubMed: 20626197]

Smith J (2016). Thinking beyond borders: reconceptualising migration to better meet the needs of people in transit. International journal of public health, 61(5), 521. [PubMed: 27017421]

Solís M, Mayorga R, & Magali Cuadra S (2004). Guatemala Puerto Barrios. In Bronfman M, Leyva Flores R & Negroni M (Eds.), Movilidad Poblacional y VIH/SIDA: contextos de vulnerabilidad en México y Centroamérica (pp. 147–173). Cuernavaca, México: Instituto Nacional de Salud Pública.

Surratt H (2007). Sex work in the Caribbean Basin: patterns of substance use and HIV risk among migrant sex workers in the US Virgin Islands. AIDS care, 19(10), 1274–1282. [PubMed: 18071971]

Surratt HL, Inciardi JA, Kurtz SP, & Kiley MC (2004). Sex work and drug use in a subculture of violence. Crime & Delinquency, 50(1), 43–59.

United Nations Office on Drugs and Crime. (2015). World Drug Report Vienna, Austria: UNODC.

Uribe-Salas F, Conde-Glez CJ, Juarez-Figueroa L, & Hernandez-Castellanos A (2003). Sociodemographic dynamics and sexually transmitted infections in female sex workers at the Mexican–Guatemalan border. Sex Transm Dis, 30(3), 266–271. [PubMed: 12616149]

Viruell-Fuentes EA (2007). Beyond acculturation: immigration, discrimination, and health research among Mexicans in the United States. Social science & medicine. 65(7), 1524–1535. [PubMed: 17602812]

Yang H, Li X, Stanton B, Chen X, Liu H, Fang X, … Mao R. (2005). HIV-related risk factors associated with commercial sex among female migrants in China. Health care for women international, 26(2), 134–148. [PubMed: 15804913]

Zimmerman C, Kiss L, & Hossain M (2011). Migration and health: a framework for 21st century policy-making. PLoS Med, 8(5), e1001034. doi: 10.1371/journal.pmed.1001034 [PubMed: 21629681]

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 1.

Sociodemographic Characteristics and Relevant Migration Information by Current Migrant Status among Substance Using Female Sex Workers at the Mexico-Guatemala border (N=266)

Characteristic	Total Sample (n=266) n (%)	Current Migrants[o] (n=77) n (%)	Non-Migrants (n=189) n (%)
Age (median, IQR *)	27 (22–34)	27 (22–33)	27 (22–35)
Years in sex work (median, IQR *)	5 (2–11)	5 (1–11)	4 (2–12)
Marital status			
Intimate Partner +	64 (24)	15 (19)	49 (26)
No Partner ++	202 (76)	62 (81)	140 (74)
Religion			
Practice any religion +++	175 (66)	43 (56)	132 (70)
None	91 (34)	34 (44)	57 (30)
Education			
Elementary school or less	149 (56)	46 (60)	103 (55)
Financial Situation			
Bad or very bad	94 (36)	21 (27)	73 (39)
Have kids	224 (84)	69 (90)	155 (82)
Kids<18y	211 (79)	64 (83)	147 (78)
Interview site			
Guatemala	201 (76)	53 (69)	148 (78)
Mexico	65 (24)	24 (31)	41 (22)
Country of origin			
Mexico	49 (18)	8 (11)	41 (22)
Guatemala	160 (60)	13 (17)	147 (77)
El Salvador	16 (6)	16 (21)	0 (0)
Nicaragua	11 (4)	11 (14)	0 (0)
Honduras	29 (11)	28 (36)	1 (0.5)
Dominican Republic	1 (0.5)	1 (1)	0 (0)
Indigenous (Mayan) **	32 (12)	13 (17)	19 (10)

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Characteristic	Total Sample (n=266) n (%)	Current Migrants[o] (n=77) n (%)	Non-Migrants (n=189) n (%)
Migration history			
Ever deported	49 (18)	32 (42)	17 (9)
Undocumented^	40 (15)	38 (49)	2 (1)
Crossed the Mexico-Guatemala border 4 times or more, past year^^	58 (22)	34 (45)	24 (14)
Exchanged sex for money for the first time in a foreign country	60 (23)	52 (68)	8 (4)
Exchanged sex for money for the first time when you were trying to move from one place to another	46 (18)	23 (30)	23 (12)
Used illicit drugs for the first time in a foreign country	45 (17)	39 (51)	6 (3)

* Interquartile range

o Migrants were defined as women currently living in a different country from where they were born.

+ Includes participants who reported being married or in common law.

++ Includes participants who reported being single, divorced, separated, and widowed.

+++ Includes Catholic, Protestant or Christian.

^ Includes not having legal permission to be in the country where interviewed or not having any personal identification.

Variables in bold were significant by Pearson Chi-Square or non-parametric Wilcoxon Rank Sum ($p<0.05$).

** Participants were asked if they identified themselves as indigenous or if they spoke any Mayan dialect (K'iche, Achí, Q'eqchi, Kaqchikel, M'am, and Zuthuil).

^^ Based on the 75th percentile. The number of times crossing the Mexico-Guatemala border ranged from 0–365 times in the past year.

Author Manuscript

Table 2.

Associations between International Migrant Status and HIV/STI risk behaviors among Substance Using Female Sex Workers at the Mexico-Guatemala border (N=266)

Characteristic	Current Migrant (n=77) n (%)	Non-Migrant (n=189) n (%)	OR (95% CI)	P Value
Alcohol and drug use				
Have a drink containing alcohol 4 or more times per week	30 (39)	50 (27)	1.77 (1.01–3.11)	0.045
Drinking more than 7 drinks on a typical day	55 (71)	131 (69)	1.11 (0.62–1.98)	0.733
Drinking 4 or more drinks on one occasion weekly or more often	58 (75)	134 (71)	1.25 (0.68–2.30)	0.466
Alcohol use in the context of sex work, past 30 days	46 (60)	137 (73)	0.56 (0.32–0.98)	0.043
Past 6 months hard drug use	68 (100)	135 (94)	3.02 (1.40–6.48)	0.005
Weekly or more hard drug use, last 6 months	51 (75)	88 (65)	2.25 (1.29–3.91)	0.004
Drug use in the context of sex work, past 30 days [**]	34 (44)	109 (58)	0.58 (0.34–0.99)	0.046
Drug use in other countries, last 12 months [***]	28 (36)	13 (7)	7.74 (3.73–16.1)	<0.001
Drug use for the first time in another country [^]	39 (51)	6 (3)	31.30 (12.4–79)	<0.001
Reason for using drugs for the first time: I was curious	39 (51)	73 (39)	1.63 (0.96–2.78)	0.073
Reason for using drugs for the first time: I was stressed or depressed	21 (27)	50 (27)	1.04 (0.57–1.89)	0.891
Sexual Risks				
Violence from clients in the work place	27 (35)	65 (34)	0.97 (0.55–1.60)	0.917
More than 20 clients, past 30 days	35 (46)	46 (24)	2.59 (1.48–4.53)	0.001
Type of work venue				
Formal [+]	31 (40)	49 (26)	1.92 (1.10–3.37)	0.022
Informal [++]	58 (75)	155 (82)	0.67 (0.35–1.26)	0.217
Pay a pimp or manager a percentage of earnings	30 (39)	44 (23)	2.10 (1.19–3.71)	0.010
People are selling drugs in main work venue	14 (18)	21 (11)	1.78 (0.85–3.71)	0.125
People are using drugs in main work venue	46 (60)	90 (48)	1.63 (0.95–2.79)	0.074
Venue rules require to drink alcohol with clients	3 (4)	17 (9)	0.41 (0.12–1.44)	0.165
Social Support				
Have someone to talk about private things	42 (55)	109 (58)	0.88 (0.52–1.50)	0.641
Have someone to lend you money	35 (45)	87 (46)	0.98 (0.57–1.66)	0.932
Current health card	17 (22)	14 (7)	3.57 (1.66–7.69)	0.001

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Characteristic	Current Migrant (n=77) n (%)	Non-Migrant (n=189) n (%)	OR (95% CI)	P Value
Condom use				
Consistent condom use with clients, past 30 days	44 (57)	69 (37)	2.32 (1.35–4.0)	0.002
Access to free condoms in the work venue, past 30 days	18 (24)	53 (28)	0.78 (0.42–1.44)	0.436

[*] Any hard drugs include cocaine, crack, and heroin in any form (smoked, inhaled and injected) as well as using some of these drugs together. Inhalants, amphetamines, and tranquilizers were excluded from this definition.

[**] Drug use with clients includes any drug, including marijuana.

[***] Besides the country where they currently live.

[+] Formal venues include reporting working in a bar, nightclub, *discoteque,* and brothel.

[++] Informal venues include reporting working in the street, *cantina*, *botanero*, closed house, hotel, massage parlor, client's car, private house, park or any other public space, place where they use or buy drugs.

[^] First place were participants used drugs is a different country than their origin country.

Boldface indicates characteristics that were statistically significantly associated at p<0.05 with migration status.

Author Manuscript
Author Manuscript
Author Manuscript
Author Manuscript

Table 3.

Associations between International Migration Status and Drug Use among Substance Using Female Sex Workers at the Mexico-Guatemala border (N=266)[^]

Type of Drug	Migrant (n=77) n (%)	Non-Migrant (n=189) n (%)	OR 95% CI	P Value
Smoke Crack and Marijuana together, past 6-months	11 (14)	12 (6)	2.46 (1.03–5.84)	**0.042**
Cocaine use, past 6-months[**]	57 (74)	114 (60)	1.89 (1.04–3.37)	**0.036**

[**] Includes, smoking, inhaling and/or injecting the drug.

Boldface indicates characteristics that were statistically significantly associated at $p<0.05$ with migration status.

[^] The reference group is non-migrant sex workers.

Author Manuscript Author Manuscript Author Manuscript Author Manuscript

Table 4.

Factors independently associated with International Migration status among Substance Using Female Sex Workers at the Mexico-Guatemala border (N=266)$^{*\wedge}$

Characteristic	AOR 95% CI	P Value
Frequent hard drug use weekly or more often, last 6 months	2.26 (1.19–4.30)	**0.013**
Drug use in other countries[+], last 12 months	7.37 (3.33–16.3)	**<0.001**
Alcohol use in the context of sex work, past 30 days	0.28 (0.14–0.58)	**0.001**
Current health card	2.94 (1.14–7.50)	**0.026**
Consistent condom use with clients, past 30 days	2.09 (1.09–3.98)	**0.025**
Pay a pimp or manager a percentage of earnings	2.31 (1.10–4.87)	**0.027**

Note. No sociodemographic characteristic (i.e., age, education, civil status) was significantly associated with migration status therefore; we did not adjust for those variables in the model.

CI= confidence interval

[+] Beyond the country of interview.

[++] The reference group is non-migrant sex workers.

[*] Variables were statistically significantly associated at $p<0.05$ with migration status.