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## Maternal role strain and depressive symptoms among female sex workers in Mexico: The moderating role of sex work venue

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### Abstract

Stressors that arise in parenting are likely to have an adverse impact on the psychological well-being of female sex workers (FSWs), particularly in low- to middle-income countries (LMIC). This study examined the association between maternal role strain and depressive symptoms among 426 FSW mothers with dependent-age children (aged < 18 years) in Tijuana and Cd. Juarez, Mexico (2016-2017). Four dimensions of maternal role strain (e.g., child emotional and behavioral problems) were examined in relation to maternal depressive symptoms. We also investigated whether the relationship between maternal role strain and depressive symptoms was modified by venue of sex work. Compared to indoor/establishment-based FSWs, street-based FSWs reported significantly more child-related financial strain. In multiple regression analysis, having more depressive symptoms was associated with identifying as a street-based FSW, greater use of drugs, lower emotional support, more child-related financial strain and more emotional and behavioral problems in children. A significant interaction was identified such that the association between maternal role strain and depressive symptoms was stronger for indoor/establishment-based compared to street-based FSWs. These findings suggest the need to address parenting strain and type of sex work venue in the development of counseling programs to improve the mental health of FSWs in LMIC.

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#### Ethical Statement

The research protocol was reviewed and approved by institutional review boards at the University of California, San Diego, Xochicalco University in Tijuana, and Salud y Desarrollo Comunitario and Federación Mexicana de Asociaciones Privadas (SADEC-FEMAP) in Cd. Juarez. All participants provided written, signed informed consent. All procedures were conducted in accordance with the 1964 Helsinki Declaration and its later amendments.

#### Conflict of Interest

The authors declare that they have no conflicts of interest.

## Keywords

Maternal role strain; mental health; depressive symptoms; female sex worker; sex work venue; Mexico

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## Introduction

Motherhood is a socially meaningful role and, in many cultures, it defines women's identity, value, and place in society (Evenson and Simon 2005; Haritavorn 2016). Among female sex workers (FSWs) and other marginalized populations, the desire to become a mother is strong, and motherhood provides a sense of purpose, engenders social respect, reduces stigma, and can solidify relationships with intimate partners (Beckham et al. 2015a; Lacey et al. 2015).

The majority of FSWs in low- to middle-income countries (LMIC), such as Mexico, are mothers, and many report entering sex work as a means of supporting dependent-age children (aged < 18 years) (Duff et al. 2015; Servin et al. 2017). In studies conducted in Burkina Faso, Kenya, Tanzania, and India, 70 to 90 percent of FSWs had at least one biological child (Aho et al. 2011; Chege et al. 2002; Elmore-Meegan et al. 2004; Papworth et al. 2015), the majority of whom were dependent-age children (Elmore-Meegan et al. 2004).

Stressors that arise in the parenting role are likely to have a potent effect on the mental health and well-being of FSWs, particularly those in LMIC where stigma, discrimination, violence, economic insecurity, substance abuse, and other risk-related behaviors prevail (Gurnani et al. 2011; Ma, Chan, and Loke 2018).

Although research on the harms experienced by the children of FSWs in LMIC has been limited, reports have appeared of poverty, stigma, discrimination, substance abuse, exposure to clients, neglect, violence, and other safety risks (Beard et al. 2010; Papworth et al. 2015; Rolon et al. 2013). One study found that the children of FSWs were often left alone at night while their mothers worked in the sex trade industry (Chege et al. 2002).

A substantial body of literature has examined parenting stress and child outcomes among other stigmatized groups of parents, particularly those with alcohol or drug use disorders (Solis et al. 2012). However, little is known about maternal role strain and its role in the mental health of FSWs, particularly in LMIC. Studies of FSWs in LMIC, including Mexico, have yielded high rates of severe depressive symptoms, ranging from 39% to 86% (Patel et al. 2015; Shen et al. 2016; Ulibarri et al. 2013). Depressive symptoms among FSWs in LMIC have been associated with substance abuse (Patel et al. 2015; Ulibarri et al. 2013), physical and sexual violence (Patel et al. 2015; Ulibarri et al. 2013), and inconsistent condom use (Shen et al. 2016). As the number of FSWs increases globally, the importance of understanding parenting strain and its association with depressive symptoms among FSW mothers has also increased.

Sex work venues are an important aspect of FSWs' risk environment (Larios et al. 2009). They have been shown to influence FSWs' HIV risk behaviors, including sexual and drug use risks (Goldenberg, Duff, and Krüsi 2015). Street-based sex workers have increased exposure to harassment, criminalization, and violence from a variety of sources, including clients, pimps, and law enforcement compared to indoor/establishment-based FSWs (Krüsi et al. 2016). Stressors and harms associated with the extreme work conditions of street-based FSWs are likely to undermine the mental health and well-being of these women. Specifically, the intersection of sex work venue and parenting strain may place street-based FSWs at increased risk for depressive symptoms compared to their indoor/establishment-based counterparts.

Tijuana and Cd. Juarez are metropolitan cities located along the northern border of Mexico adjacent to San Diego, CA and El Paso, TX. Both cities are characterized by thriving sex trade industries and concentrated HIV epidemics (Strathdee and Magis-Rodriguez 2008). The number of FSWs working in Tijuana and Cd. Juarez has been estimated at 9000 and 4000, respectively (Patterson et al. 2008). HIV prevalence among FSWs in these cities has been reported as 6.0% overall and 12% among FSWs who inject drugs (Strathdee et al. 2013).

We examined four dimensions of maternal role strain and their associations with depressive symptoms among FSWs in Tijuana and Cd. Juarez. We also investigated whether the relationship between overall maternal role strain and depressive symptoms was modified by type of sex work venue. We hypothesized that the association between maternal role strain and depressive symptoms would be stronger for street-based FSW mothers compared to their indoor/establishment-based counterparts.

## Methods

### Sample Selection

The sample consisted of FSWs in Tijuana and Cd. Juarez who self-identified as the mother of one or more dependent-age children (i.e., less than 18 years old). This sample was drawn from a larger study of participants enrolled in a brief sexual risk reduction intervention with a text messaging maintenance component (Patterson et al. 2018). To be eligible for the intervention study, participants had to be cisgender female, at least 18 years of age, self-identify as a FSW, report having traded sex for drugs, money, shelter or other material benefit in the previous month, have had unprotected vaginal or anal sex with a client at least once during the previous month, have no previous human immunodeficiency virus (HIV)-positive test result, own a cell phone, and agree to be tested for HIV and sexually transmitted infections at baseline and six-month follow-up assessments.

Persons were excluded from study participation if they had not been sexually active with a client or always used condoms with all clients in the past month, were trying to become pregnant, or had a psychiatric diagnosis with current psychotic symptoms or suicidal ideation.

## Recruitment

Between January 2016 and December 2017, 600 FSWs (300 in Tijuana, 300 in Cd. Juarez) were recruited for the intervention study, known as *Mujer Saludable Siempre* (MSS) or *Healthy Woman Forever*. A subset of 426 FSWs who met inclusion and exclusion criteria and reported having at least one child under the age of 18 years was selected for the analytic sample. The primary sampling strategy for MSS involved time-location sampling (Patterson et al. 2008). Outreach workers located prospective participants using up-to-date maps of venues that FSWs were known to frequent (e.g., bars, shooting galleries, street corners). Women who were interested in the study were referred for a screening interview to our office in Tijuana's red-light district or to our office at *Salud y Desarrollo Comunitario de Ciudad Juarez* and *Federación Mexicana de Asociaciones Privadas* (SADEC-FEMAP) located in downtown Cd. Juarez. Women who were deemed eligible for the study were scheduled for a two-hour baseline visit, which included a face-to-face interview (taking approximately 60 minutes) via computer-assisted personal-interviewing (CAPI; Nova Software, MD, USA), and the *Mujer Más Segura* counseling session (taking 30–45 minutes) (Strathdee et al. 2013). Participants were reimbursed the equivalent of \$30 USD for their baseline visit. Eligibility and participation rates for the study were 73.1% and 93.8%, respectively. All study procedures were approved by ethics committees at the University of California, San Diego, Xochicalco University in Tijuana, and SADEC-FEMAP in Cd. Juarez. Written, signed informed consent was obtained from all participants.

## Measures

**Maternal Role Strain.**—A modified version of the parental role strain scale was used in this study (Semple et al. 1997). The original scale was developed for use with HIV-positive parents of dependent-age children and later adapted for use with methamphetamine-using parents (Semple et al. 2011). The present study used four subscales of the parental role strain scale. Three items in the original scale that referred to parents' HIV status or methamphetamine use were rewritten to reflect stressors that are unique to FSW mothers. For example, an item about fear of disclosure of HIV serostatus to children was rewritten to capture maternal fear of disclosure regarding her employment as a sex worker. Scale items were measured on a four-point scale ranging from 1 (never) to 4 (very often) (Appendix 1). A summary score for maternal role strain was also computed. The total possible range of scores for each dimension of role strain and the summary score appear in Appendix 1. Dimensions of maternal role strain are described below.

(1) Stressors involving child(ren)'s behavior and emotional health (Cronbach's alpha = 0.76). Four items were used to assess maternal stressors arising from children's emotional and behavioral problems, including interpersonal difficulties at school or on the playground, learning problems, and "run-ins" with the law.

(2) Stressors involving child(ren)'s physical health (Cronbach's alpha = 0.80). Three items were used to assess stressors involving physical health problems of child(ren) and included common childhood illnesses (e.g., flu, measles), chronic conditions such as diabetes, and hospitalizations or surgeries resulting from acute illness, accidents, or birth defects.

(3) Financial strain related to child(ren) (Cronbach's alpha = 0.70). Three items were used to assess child-related financial strain arising from insufficient income to provide for children's basic needs, problems paying or collecting child support, and problems finding affordable and reliable child care.

(4) Intrapsychic stressors related to child(ren) (Cronbach's alpha = 0.64). Three items were used to assess maternal sources of stress that involve feelings of guilt and shame about being a sex worker and/or user of drugs, fear of losing esteem with one's children if sex worker status were revealed, and internal struggles regarding whether or not to disclose stigmatized behaviors (e.g., sex work/and or drug use).

**Type of Sex Work Venue.**—Participants were presented with a list of nine types of sex workers (barmaid, dance hostess, taxi girl, brothel worker, street worker, lover, call girl or escort, companion for parties and vacations, other) and asked to indicate the one that best described their work situation. Responses were recoded into a binary variable that categorized the type of sex work venue as either street-based worker (coded 1) or indoor/establishment-based (coded 0). Street-based sex worker encompassed the single category of 'street worker' defined as FSWs who solicit clients in street venues (e.g., street corner, alley).

**Depressive Symptoms.**—The 21-item Beck Depression Inventory (BDI-II) was used to measure depressive symptoms experienced over the previous two weeks (Beck 1996). Each item has four graded statements that are scored from 0 to 3 to show increasing depressive symptoms. Summary scores ranged from 0 to 63. Depressive symptoms were treated as a continuous variable.

**Emotional Support.**—The seven-item emotional support scale (Pearlin et al. 1990) was used to capture key elements of support, including the availability of family and friends who are perceived as caring, trustworthy, uplifting, and able to keep a confidence. Items were rated on a four-point scale from 1 (strongly disagree) to 4 (strongly agree). A mean score was computed.

**Substance Use.**—Participants were asked about their use of 12 often-used street drugs (e.g., marijuana, cocaine, methamphetamine, heroin) during the past month. Frequency of use was rated on a scale from 0 (never) to 6 (every day), and responses were then recoded into 12 binary variables (0 = does not use drug; 1 = does use drug). A summary variable that summed the 12 binary drug use variables was computed to represent total number of drugs used in the past month. For each drug named, participants were also asked to report the method of administration. Injection drug use in the past month was coded 1 = yes, 0 = no. Frequency of alcohol use during the last year was measured by the 10-item Alcohol Use Disorders Identification Test (AUDIT-10) (Saunders et al. 1993). The five response categories ranged from 0 (never) to 4 (four or more times a week). Summary scores for the AUDIT ranged from 0 to 40.

**Socio-demographics.**—Number of children aged < 18 years, age of mother, average age of children, and number of years having worked as a sex worker were treated as continuous

variables. Partner status (has a spouse/steady partner = 1, no spouse/steady partner = 0), level of education grade school or less (yes = 1, no = 0), whether the FSW lived with at least one child under 18 years (yes = 1, no = 0), whether FSW lived with a spouse/steady partner (yes = 1, no = 0), and average monthly income over the past six months (  $\leq 3500$  pesos [ $\sim$  \$183 USD] = 1,  $> 3499$  pesos = 0) were coded as binary variables.

### Statistical analysis

Among the subsample of 426 FSWs selected for these analyses, we examined differences between street-based and indoor/establishment-based FSWs using chi-square tests for binary variables and t-tests for continuous variables. The dependent variable for the regression analyses was defined as participants' scores on the BDI-II. Two hierarchical multiple regression analyses were performed. The first regression assessed the relationship between the four dimensions of maternal role strain and depressive symptoms, controlling for socio-demographic and psychosocial and behavioral factors on the basis of the literature. BDI-II scores were regressed on three sets of variables. In Step 1, control variables were entered in the model, including age of mother, number of children less than 18 years, at least one child  $< 18$  years living with the mother (yes/no), spouse or steady partner lives with mother (yes/no), mother is currently taking psychiatric medication (yes/no), average monthly income over the past six months, and type of sex work venue (street-based vs. indoor/establishment-based). In Step 2, psychosocial and behavioral factors associated with depressive symptoms were added to the model, including emotional support, number of drugs used in the past month, and alcohol use (AUDIT-10). In Step 3, the four maternal role strain variables were entered as a block.

The second model evaluated the moderating role of the venue of sex work on the relationship between maternal role strain and depressive symptoms. BDI-II scores were regressed on four sets of variables. Variables entered in Steps 1 and 2 were identical to those in Model 1. In Step 3, participants' summary scores on the maternal role strain scale (as opposed to the individual dimensions) were entered into the model. In Step 4, an interaction term for sex work venue  $\times$  overall maternal role strain was entered into the model.

For each model, we assessed model fit by examining a residual plot with the independent variable on the x-axis and residuals on the y-axis. In both instances, the random plot pattern indicated that a linear model was the appropriate fit to the data.

## Results

### Sample Characteristics

The average age of participants was 33.8 years ( $SD=8.0$ , range 18–56 years); 85.4% reported an educational level of secondary school or less; 56.3% were never married; the majority lived with a child(ren) (66.2%), and the average age of children was 9.6 years ( $SD = 4.7$ , range  $<1$ –17 years). Sixty-one percent worked in a street-based venue, while 39% worked in an indoor/establishment-based venue. Compared to indoor/establishment-based FSWs, street-based FSWs were significantly more likely to be older and have older children, more likely to be married or have a common-law partner, more likely to have an average

monthly income of less than 3500 pesos over the past six months, less likely to be living with children and more likely to be living with a spouse or steady partner, had higher BDI-II scores, lower emotional support, lower AUDIT-10 scores, and used a greater number of drugs in the past month (Table 1). Street-based and indoor/establishment-based FSWs did not differ in terms of education or number of children < 18 years. Using a cut-point of greater than 20 on the BDI-II (Beck et al., 1996), 31.7% of FSW-mothers met criteria for moderate to severe depression.

### **Exposure to maternal role strain and group differences based on FSWs sex work venue**

For the overall sample, the highest levels of maternal role strain occurred in relation to intrapsychic strains related to children ( $M = 6.2$ ,  $SD = 2.4$ ), followed by emotional/behavioral problems of children (Mean score = 5.4,  $SD = 2.1$ ), financial strain related to children (Mean score = 4.7,  $SD = 2.0$ ), and physical health problems of children (Mean score = 3.6,  $SD = 1.2$ ). Street-based FSWs reported significantly more child-related financial strain compared to indoor/establishment-based FSWs. The two groups did not differ on the other three dimensions of maternal role strain or total role strain score (Table 1).

### **Hierarchical linear regression: Model 1 (Dimensions of maternal role strain and depressive symptoms)**

In step 1, sociodemographic variables accounted for a significant portion (18%) of the variance in depressive symptoms ( $R^2 = 0.182$ ). Having at least one child living with the mother and earning more income were associated with fewer depressive symptoms, while being a street-based sex worker and currently taking psychiatric medications were associated with more depressive symptoms (Table 2). In step 2, psychosocial and behavioral factors contributed a small but significant 6% of variance ( $R^2 = 0.057$ ). Emotional support was inversely associated with depressive symptoms, whereas number of drugs used in the past month was positively associated with depressive symptoms. In step 3, maternal role strain dimensions accounted for a small but significant 6% of the variance in depressive symptoms ( $R^2 = 0.064$ ). FSWs who reported more financial strain related to children and more emotional/behavioral problems in their children had more depressive symptoms. Also, at this step, having at least one child living with the mother, having an average monthly income less than 3500 pesos over the last six months, lower emotional support, and greater use of drugs used in the past month remained significant. Sex work venue and psychiatric medication use, which were significant at step 1, were no longer statistically significant (Table 2).

### **Hierarchical linear regression: Model 2 (Overall maternal role strain x venue and depressive symptoms)**

To explore the potential moderating role of sex work venue in the relationship between maternal role strain and depressive symptoms, we tested a second model in which overall maternal role strain score (summary score) was entered in step 3 and a single interaction term (overall maternal role strain x sex work venue type) was entered into step 4. For steps 1 and 2, all variables were entered in the same order as presented in Model 1. In step 3, overall maternal role strain accounted for a small but significant 4 percent of the variance in depressive symptoms ( $R^2 = 0.036$ ) (Table 3). In step 4, the significant interaction term accounted for a small 0.9% of variance in depressive symptoms ( $R^2 = 0.009$ ). Street-based



sex workers had high levels of depressive symptoms, regardless of their level of maternal role strain, while indoor/establishment-based FSWs had significantly higher levels of depressive symptoms in the context of high levels of maternal role strain (Figure 1). This finding suggests that the relationship between depressive symptoms and maternal role strain was moderated by the venue of sex work but in the opposite direction of the hypothesis proposed.

## Discussion

FSWs with dependent-age children in Mexico reported levels of maternal role strain similar to those reported by methamphetamine-using and HIV+ mothers of dependent-age children in the US (Semple et al. 1997; 2011). Street-based FSWs reported significantly higher levels of child-related financial strain compared to their indoor/establishment-based counterparts. This finding most likely reflects differences in socio-demographic characteristics of FSWs in the two groups. Street-based FSWs had significantly lower income than indoor/establishment-based FSWs, and the children of street-based FSWs were also older, which may be a marker for increased expenses (e.g., clothing, education) associated with the needs of growing children.

Two dimensions of parenting strain – child-related financial strain and emotional/behavioral problems of children -- were associated with depressive symptoms, thereby indicating the importance of examining the multi-dimensional nature of maternal role strain. The positive association between child-related financial strain and depressive symptoms highlights the struggle that FSWs face when they do not have adequate resources to provide for the basic needs of their dependent-age children. Beckham et al. (2015b) reported that FSWs sometimes rely on income from their clients to provide for their children's basic needs, which often results in FSW mothers engaging in increased risk behaviors (e.g., sex without condoms) with clients. Even among FSWs who have a spouse or steady partner, the costs associated with childrearing have forced couples to accept the many risks of sex work in exchange for income to provide for dependent-age children (Beckham et al. 2015b; Rolon et al. 2013).

The economic challenges faced by FSWs, particularly street-based FSWs, are not easily resolved. Structural interventions that create employment opportunities for women outside of the sex trade industry, along with job skills training, are urgently needed (Blankenship et al. 2006). Government investment in job training, educational opportunities and child care offer the best chances for long-term solutions that address parenting needs, reduce maternal role strain, enhance mothers' emotional well-being, and improve child outcomes.

Few studies have examined the extent of emotional and behavioral problems among dependent-age children of FSWs. However, it has been documented that children of FSWs are often exposed to violence, substance abuse, and impoverished home environments (Rolon et al. 2013), which may contribute to the development of emotional and behavior problems, especially among the children of drug-using populations. Indeed, high levels of externalizing behaviors have been identified among pre-school age children of drug-using mothers (Asanbe, Hall, and Bolden 2008). Thus, the children of drug-using FSWs may be at

increased risk for experiencing higher levels of emotional and behavioral problems that add to maternal role strain and depressive symptoms. More research is needed to enhance our understanding of the conditions that contribute to emotional/behavioral problems among children of FSWs in LMIC.

The number of drugs used in the past month was also positively associated with depressive symptoms among FSWs. Previous research has demonstrated that drug treatment programs that address parenting issues have resulted in improvements in maternal outcomes, including reduced psychological distress, better family interactions, and reduced parenting strain (Conners et al. 2006). Because parental misuse of substances has been associated with child maltreatment (Hooks 2015), it is imperative that drug treatment programs for FSWs address the co-occurrence of depressive symptoms, drug use, and maternal role strain, and offer child care options so that mothers are not separated from their children during drug treatment.

Emotional support was found to be inversely associated with depressive symptoms. Parenting programs that promote the development and mobilization of social supports are likely to improve the mental health of FSW mothers. Indeed, family support has been shown to play a key role in the treatment of persons with substance use and psychiatric disorders (Mueser et al. 2009). Our findings suggest that family-focused treatment models should be developed and evaluated among FSW mothers. Community mobilization models that empower FSWs might also be useful for enhancing support within sex worker networks and addressing parenting needs.

Contrary to expectation, the relationship between overall maternal role strain and depressive symptoms was stronger for indoor/establishment-based sex workers than for street-based FSWs. This finding is most likely associated with the difficult work environments of street-based FSWs in Mexico who are faced with multiple challenges, including competition for clients and lower income, which affects their ability to provide for dependent-age children (Rolon et al. 2013). Street-based FSWs typically sell sexual services at low rates while facing violence, drug use, police harassment and other difficult conditions (Krüsi et al. 2016). Because of the high levels of stress experienced by street-based FSWs, depressive symptoms in this group appeared to be consistently high, and less related to increased levels of maternal role strain. In contrast, among indoor/establishment-based sex workers who had lower depressive symptoms, presumably because indoor sex venues offer slightly more protection from the vicissitudes associated with life on the streets, higher levels of exposure to maternal role strain was associated with increased depressive symptoms.

Our findings suggest the need for the development of interventions that address maternal role strain, depressive symptoms, and enhancement of social support among FSW mothers. Such programs are not currently available in Mexico. However, a number of interventions have been developed for marginalized populations in the US and might be potentially adapted for use with FSWs in LMIC. In The Healthy MOMS intervention, which focused on stress reduction and enhancement of social supports, highly stressed mothers showed greater improvements in maternal distress compared to the comparison condition (Davies et al. 2009; Johnson et al. 2015). The IMAGE intervention for HIV+ mothers (Improving

Mothers' Parenting Abilities, Growth and Effectiveness), which sought to enhance parenting skills for HIV+ mothers, reported improvements in parenting practices, family outcomes, and parent-child relationships at one-year follow-up (Murphy et al. 2017). Intervention components, which could be adapted for FSW mothers include: strategies for improving parent-child communication, and enhancement of supports for dealing with psychological distress (Murphy et al. 2010). Components that would be unique to FSWs might include communication with family members and children (when age appropriate) about sex worker stigma and coping strategies.

## Research Directions

Future studies should examine subgroup differences in exposure and vulnerability to maternal role strain based on other factors, such as stigma and substance abuse, which have been shown to have adverse effects on parenting abilities and family functioning (Duff et al. 2015). Also, the association between having a dependent-age child living in the home and fewer depressive symptoms suggests that child-related factors (e.g., parent-child emotional bonds) may have a protective effect on the mental health of FSW mothers (Beard et al. 2010). Further research is warranted. Additionally, enhanced understanding of the relationship between maternal role strain and depressive symptoms has the potential to improve child and family outcomes by motivating mothers to reduce drug-using behaviors and increase their use of health and social service programs. Finally, clinical assessments should be performed to determine the relationship between maternal role strain and clinical levels of depressive symptoms.

## Limitations

The present sample may not be representative of FSW mothers of dependent-age children in Tijuana and Cd. Juarez or elsewhere in Mexico. Some exclusionary criteria that were adopted for the intervention study (e.g., exclusion of HIV+ FSWs) could have resulted in different levels of exposure and vulnerability to maternal role strain and depressive symptoms. Because our sample was drawn from an intervention study, these findings should not be generalized to the general population of FSWs in Mexico. The data gathered in this study were self-reported and thus are subject to socially desirable responding. It is plausible that depressive symptoms shaped participants' perceptions of maternal role strain. Also, our cross-sectional data preclude us from making causal inferences between maternal role strain and depressive symptoms.

## Conclusions

Motherhood is a role that can contribute to the positive identities of FSWs by motivating healthier lifestyles, increasing safer sex practices, as well as HIV testing and health care use (Beckham et al. 2015b; Papworth et al. 2015; Rolon et al. 2013). Because motherhood is a highly respected role around the globe, development and implementation of prevention interventions that address parenting needs and depressive symptoms are urgently needed to promote healthier lifestyles and better mental health for FSW mothers.

## Acknowledgements

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## Appendix 1

### 1. *Stressors involving emotional health/behavior of child(ren)<sup>a</sup> (alpha = 0.76)*

Now, I would like to ask more questions about your experience as a parent. In the past year, how often did:

- A. your child(ren) show behavioral problems at school or on the playground (e.g., acting out, withdrawn, not getting along with other children)?
- B. your child(ren) have a “run-in” with the law?
- C. your child(ren) have learning difficulties or problems completing schoolwork?
- D. your child(ren) show signs of an emotional problem?\*

### 2. *Stressors involving the physical health of child(ren)<sup>b</sup> (alpha = 0.80)*

- A. your child(ren) experience a serious health event that required hospitalization or surgery?
- B. your child(ren) experience a health problem that (requires/required) ongoing medical treatments?
- C. your child(ren) have a physical illness that lasted more than one week?

### 3. *Financial strain related to child(ren)<sup>c</sup>(alpha = 0.70)*

- A. you have problems either getting child support payments or making your child support payments?
- B. you have insufficient money to provide for the basic needs of your child(ren) (e.g., food, clothing, education, medical care)?
- C. you have problems arranging for good quality, affordable child care?

### 4. *Intrapsychic stressors related to child(ren)<sup>d</sup> (alpha = 0.64)*

- A. you tell your child(ren) something that was difficult for you to talk about (e.g., your drug use or sex work)?\*
- B. you worry that your child(ren) will find out that you are a sex worker?\*
- C. you feel guilty that your children have a mother who is a sex worker?\*

\*Original scale item modified for use with female sex workers

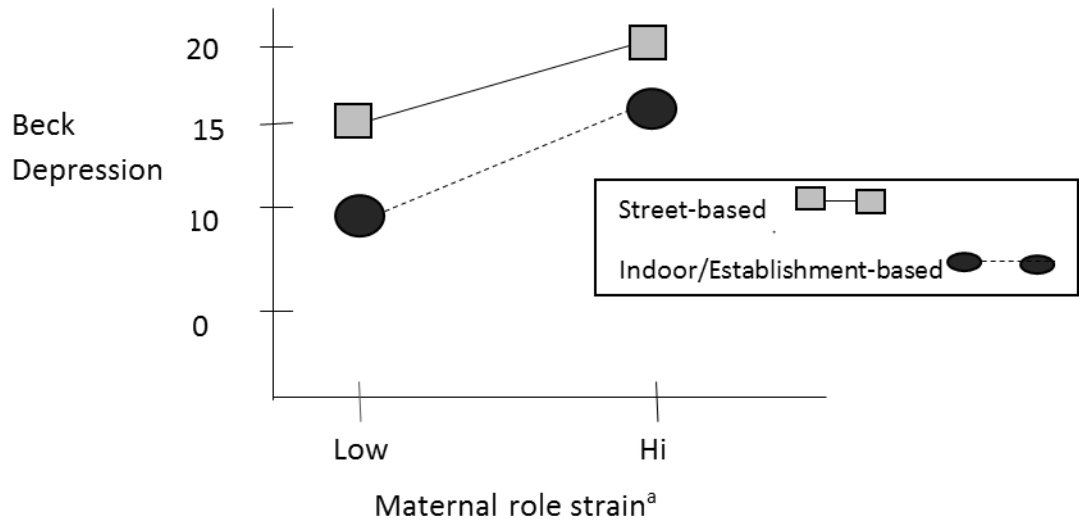
Possible range of scores for maternal role strain dimensions: <sup>a</sup>4–16; <sup>b</sup>3–12; <sup>c</sup>3–12; <sup>d</sup>3–12; and total maternal role strain scale (range 13–52)

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**Figure 1.** Association between maternal role strain and depressive symptoms for indoor/establishment-based FSWs compared to street-based FSWs.  
<sup>a</sup>To facilitate interpretation of the interaction plot, overall maternal role strain scores were dichotomized into high versus low strain using a median split.



**Table 1.**

Characteristics of female sex workers with at least one dependent-age child (< 18 years) in Tijuana and Cd. Juarez, Mexico ( $N = 426$ )

Variable	Street-based FSWs ( $N = 262$ )	Establishment-based/Indoor FSWs ( $N = 164$ )	Test statistics	p-value
<i>Marital Status</i>			$\chi^2 = 12.2$	0.007
Never married	52.3% (137)	62.8% (103)		
Married or common-law	34.0 (89)	20.7 (34)		
Divorced or separated	11.1 (29)	15.9 (26)		
Widowed	2.7 (7)	0.6 (1)		
<i>Education</i>			$\chi^2 = 10.4$	0.169
Some grade school	13.7% (36)	11.6% (19)		
Grade school	31.3 (82)	24.4 (40)		
Some secondary school	12.2% (32)	15.2 (25)		
Secondary school	27.5 (72)	35.4 (58)		
Some high school	9.2 (24)	7.9 (13)		
High school	3.4 (9)	5.5 (9)		
Some university	2.3 (6)	0 (0)		
Read/write, no education	0.4 (1)	0 (0)		
<i>Average Monthly Income<sup>a</sup></i>			$\chi^2 = 24.1$	<0.001
Less or equal to 3499 Mexican pesos (~\$183 USD)	27.5% (72)	7.9% (13)		
3500 or more Mexican pesos (~\$183 USD)	72.5 (190)	92.1 (151)		
<i>Number of Children &lt; 18 years, mean (SD)</i>	3.2 (1.7)	3.1 (1.5)	$t = -0.93$	0.352
<i>Household Composition</i>			$\chi^2 = 28.3$	<0.001
Lives with child(ren) and spouse/steady partner	16.8% (44)	14.6% (24)		
Lives with child(ren) only	40.8% (107)	65.2% (107)		
Lives with spouse/ steady partner only	14.1% (37)	4.3% (7)		
Does not live with spouse/steady partner or child(ren)	28.2% (74)	15.9% (26)	$\chi^2 = 7.5$	0.006
Lives with at least one child < 18 years	57.6% (151)	79.9% (131)	$\chi^2 = 22.3$	<0.001
Children's mean age (SD)	10.1 (4.6)	8.7 (4.9)	$t = 2.74$	0.006
Maternal mean age (SD)	34.9 (7.9)	32.2 (7.9)	$t = 3.45$	0.001
Depressive symptoms (SD)	18.3 (11.8)	12.1 (8.8)	$t = 5.70$	<0.001
Meets criteria for moderate to severe clinical depression	38.5% (101)	20.7% (34)	$\chi^2 = 14.8$	<0.001
Emotional support mean (SD)	2.8 (0.68)	3.0 (0.51)	$t = 4.4$	<0.001
AUDIT-10 mean (SD)	7.7 (9.9)	11.7 (8.6)	$t = 4.2$	0.001
Number of drugs used <sup>b</sup> mean (SD)	1.5 (1.6)	0.76 (1.1)	$t = 5.4$	<0.001
Amount earned in pesos for vaginal sex without a condom, mean (SD)	320 (249)	451 (350)	$t = 4.0$	<0.001
Amount earned in pesos for anal sex without a condom, mean (SD)	164.3 (261)	164.3 (272)	$t = 0.002$	0.998
<i>Child-related Stressors<sup>c</sup></i>				
Emotional or behavioral problems of child(ren)(range 4-16) <sup>d</sup>	5.5 (2.1)	5.4 (1.8)	$t = 0.57$	0.569

Variable	Street-based FSWs (N = 262)	Establishment-based/Indoor FSWs (N = 164)	Test statistics	p-value
Physical health problems of child(ren)(range 3-12) <sup>d</sup>	3.6 (1.4)	3.5 (0.94)	t = 0.59	0.555
Financial strain related to child(ren)(range 3-12) <sup>d</sup>	5.0 (2.1)	4.6 (1.8)	t = 2.14	0.033
Intrapsychic strain related to child(ren)(range 3-12) <sup>d</sup>	6.3 (2.5)	6.5 (2.2)	t = 1.01	0.315
Total maternal role strain (range 7-38) <sup>d</sup>	19.9 (5.6)	20.0 (4.5)	t = 0.16	0.870

<sup>a</sup>In past six months;

<sup>b</sup>In past month;

<sup>c</sup>Six cases missing maternal role strain data;

<sup>d</sup>In present sample

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**Table 2.**

Multivariable regression of depressive symptoms regressed on socio-demographic variables (Step 1), psychosocial factors (Step 2), and dimensions of maternal role strain (Step 3)(N=411)<sup>a</sup>

Variable	Step 1		Step 2		Step 3	
	beta	sr <sup>2</sup>	beta	sr <sup>2</sup>	beta	sr <sup>2</sup>
Age of mother	-0.041	0.001	-0.037	0.001	-0.011	0.000
At least one child lives with FSW (y/n)	-0.171***	0.026	-0.131**	0.015	-0.192***	0.030
FSW lives with spouse/steady partner (y/n)	0.059	0.003	0.041	0.002	0.054	0.003
Number of children	0.061	0.003	0.061	0.003	0.004	0.000
On psychiatric medication	0.090*	0.008	0.080	0.006	0.064	0.004
Sex work venue (street-based vs. indoor/establishment-based)	0.157***	0.022	0.111*	0.010	0.084	0.005
Average monthly income ( 3500 pesos) <sup>b</sup>	-0.244***	0.052	-0.242***	0.048	-0.197***	0.030
Emotional support			-0.129**	0.015	-0.116**	0.011
Number of drugs used in the past month			0.189***	0.029	0.175***	0.025
Alcohol Use (AUDIT-10)			0.058	0.003	0.045	0.002
Child-related physical illness					0.069	0.004
Child-related emotional and behavioral problems					0.126**	0.013
Child-related intrapsychic strain					0.035	0.001
Child-related financial strain					0.168***	0.023
R <sup>2</sup>		0.182		0.240		0.304
R <sup>2</sup> change		0.182***		0.057***		0.064***
Multiple R		0.427		0.490		0.551
Adjusted R <sup>2</sup>		0.168		0.221		0.279
F (df)		12.84*** (7,403)		12.62*** (10,400)		12.32*** (14,396)

beta = standardized regression coefficient; sr<sup>2</sup> = squared semi-partial correlation coefficient;

\* p<0.05;

\*\* p<0.01;

\*\*\* p<0.001 (2-tailed tests)

<sup>a</sup>Fifteen cases missing data on one or more dimensions of maternal role strain;

<sup>b</sup>In past six months.

**Table 3.**

Multivariable regression of depressive symptoms regressed on socio-demographic variables (Step 1), psychosocial factors (Step 2), total parenting strain (Step 3), and total parenting strain x type of sex work venue (N=426)

Variable	Step 1		Step 2		Step 3		Step 4	
	beta	sr <sup>2</sup>	beta	sr <sup>2</sup>	beta	sr <sup>2</sup>	beta	sr <sup>2</sup>
Age of mother	-0.028	0.001	-0.026	0.001	-0.018	0.000	-0.024	0.000
At least one child lives with FSW (y/n)	-0.189***	0.032	-0.152***	0.020	-0.220***	0.038	-0.214***	0.035
FSW lives with spouse or steady partner (y/n)	0.032	0.001	0.020	0.000	0.021	0.000	0.023	0.001
Number of children	0.062	0.003	0.060	0.003	0.026	0.001	0.022	0.000
On psychiatric medication (y/n)	0.083	0.007	0.074	0.005	0.057	0.003	0.063	0.004
Sex work venue (street-based vs. indoor/ establishment-based)	0.166***	0.024	0.115*	0.010	0.105*	0.009	0.492**	0.013
Average monthly income ( 3500 pesos) <sup>a</sup>	-0.202***	0.036	-0.194***	0.031	-0.180***	0.026	-0.180***	0.027
Emotional support			-0.142**	0.018	-0.147***	0.019	-0.148***	0.020
Number of drugs used in past month			0.178***	0.026	0.168***	0.023	0.170***	0.023
Alcohol Use (AUDIT-10)			0.029	0.001	0.021	0.000	0.023	0.000
Total parenting strain <sup>b</sup>					0.204***	0.036	0.348***	0.034
Total parenting strain <sup>b</sup> × sex work venue							-0.421*	0.009
R <sup>2</sup>	0.169		0.221		0.257		0.265	
R <sup>2</sup> change	0.169***		0.052***		0.036***		0.009*	
Multiple R	0.411		0.470		0.507		0.515	
Adjusted R <sup>2</sup>	0.155		0.202		0.237		0.244	
F (df)	12.12*** (7,418)		11.75*** (10,415)		13.00*** (11,414)		12.44*** (12,413)	

beta = standardized regression coefficient; sr<sup>2</sup> = squared semi-partial correlation coefficient;

\* p<0.05;

\*\* p<0.01;

\*\*\* p<0.001 (2-tailed tests)

<sup>a</sup> In the past six months;

<sup>b</sup> In past year.