



Pilot Study Exploring Migration Experiences and Perinatal Depressive and Anxiety Symptoms in Immigrant Latinas

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Abstract

Introduction Migration-related experiences can increase Latinas' risk of perinatal depression and anxiety. Few studies have investigated these associations among Latinas due to a lack of survey instruments explicitly assessing migration experiences. This study assessed the feasibility and acceptability of the Migration Experiences Survey (MES), a newly-developed measure of migration and deportation fears and explored associations between those experiences and mental health in a sample of immigrant Latinas in the perinatal period.

Methods This cross-sectional study recruited women from community health clinics in Chapel Hill, NC between July 2013 and 2014. Twenty-five immigrant women were enrolled in the study during their third trimester of pregnancy. Women were interviewed in English or Spanish during pregnancy and at 8 weeks postpartum. The Edinburgh Postnatal Depression Scale was used to assess depressive symptoms and the Spielberger State-Trait Anxiety Inventory was used to determine anxiety symptoms. The MES was administered at 8 weeks postpartum. Nonparametric tests were conducted to determine associations between deportation fears and maternal mood.

Results Results show that the MES is acceptable for collecting data on migration experiences and assessing deportation fears among immigrant Latinas, regardless of depressive or anxiety symptoms. More than 40% had migration safety concerns and fears of deportation. Self or family-related fears of deportation were significantly associated with prenatal state anxiety and trait anxiety ($p < .05$). No significant associations between deportation fears and depressive symptoms were observed.

Discussion The MES is a useful tool for gathering information about migration experiences associated with perinatal anxiety.

Keywords Latinas · Immigrant · Migration · Depressive symptoms · Anxiety symptoms · Perinatal

Significance

Prior research suggests that Latino immigrants have a greater risk for developing depression or anxiety than nonimmigrants, possibly due to stressful migration experiences and post-migration discrimination. Prenatal and postpartum immigrant Latinas also have elevated risk of depression and anxiety. However, few studies have examined associations between migration experiences and deportation fears and Latinas' mental health. Using a newly developed measure, this study showed an association between those risk factors and anxiety, highlighting the important dimensions of vulnerability in immigrant Latinas. This finding is particularly important given the current social-political climate that challenges the safety and mental health of these women.

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Introduction

Traumatic migration experiences can be detrimental to women of childbearing age, as these stressors may have lingering effects that increase the risk of perinatal depression and anxiety. Mood disorders represent a significant concern for perinatal women; perinatal depression affects 9.8–22.7% of women in the United States and estimates of the prevalence of perinatal anxiety range from 2.6 to 39% (Ashley et al. 2016; Field 2018; Ko et al. 2017; Leach et al. 2017). Moreover, comorbid perinatal depression and anxiety is also common, affecting up to 9.5% of pregnant and postpartum women globally (Falah-Hassani et al. 2017). Latinas may be at an even greater risk of mood disorders, with rates for perinatal depression and anxiety as high as 60% and 19.4%, respectively (Lucero et al. 2012; Preciado and D'Anna-Hernandez 2017). Despite the growing literature on immigration and mental health, the influence of migration experiences, including deportation fears, on perinatal depression and anxiety among Latinas is not well understood.

Prior research indicates that Latino immigrants have a greater risk for developing depression or anxiety than non-immigrants (Breslau et al. 2011). This finding may be due to culturally-relevant stressors, like discrimination and acculturative stress, and stressful migration experiences, such as dangerous border crossings (Crocker 2015; Joseph 2011; Sangalang et al. 2018; Torres and Wallace 2013). Trauma during migration is common among immigrant Latinas, who are vulnerable to sexual assault and kidnapping (Kaltman et al. 2011). Given that traumatic events are associated with 3.6 times increase in depression among non-pregnant immigrant Latinas, it stands to reason that Latinas' traumatic experiences during migration may also be associated with mental disorders in the perinatal period (Kaltman et al. 2010).

Latinos who are undocumented experience additional stressors that put them at risk for anxiety and depression. In fact, an estimated 23% of undocumented Latinos have a mental disorder (Garcini et al. 2017). One review identified several risk factors that characterize the psychological burden faced by undocumented Latinos, including stressful hypervigilance, the stigma of their legal status, limited mobility, a lack of resources, feeling isolated or marginalized, being vulnerable to exploitation, feeling fearful, and a sense of having failed in one's country of origin (Sullivan and Rehm 2005). However, the most salient of stressors experienced by Latinos with unauthorized family members or who fear being profiled as undocumented may be immigration enforcement activities and associated threat of deportation. Both documented and undocumented Latinos report high levels of stress due to fears of deportation

(Hacker et al. 2011), which can negatively affect daily functioning (Ayón 2017). Furthermore, both deportation fears and undocumented status have been found to increase the risk of anxiety in Latinos (Potochnick and Perreira 2010; Salas-Wright et al. 2015). Thus, due to the unique risk profile they possess, Latinas who fear deportation for themselves or others may be at even greater risk for perinatal depression and anxiety (Sullivan and Rehm 2005).

Given the potential negative effects that migration experiences and deportation threats can exert on Latinas' mental health, a systematic assessment of how these risk factors might be associated with maternal mood is needed. However, our summary of the literature found several gaps. First, research is typically centered on how stressors experienced during the migration process and American immigration policy affect child well-being (Gulbas et al. 2016; Hainmueller et al. 2017; Potochnick and Perreira 2010; Valdez et al. 2013). Moreover, most previous studies on deportation fears and migration experiences have relied on semi-structured interviews (Ayón 2017; Crocker 2015; Hacker et al. 2011; Joseph 2011). Furthermore, existing measures of migration experiences are primarily designed to assess migration patterns (National Research Council 2013), limiting our understanding of their effect on mental health. The few measures that do assess Latinos' traumatic migration experiences are limited in that they lack detail or do not capture the nuances of traumatic experiences specific to migration, such as risk of sexual assault and the involvement of a *coyote* (a colloquial Spanish term used to refer to an individual hired to lead a border crossing) (Kaltman et al. 2010; Potochnick and Perreira 2010). Further, Kaltman et al. (2011) assert that the traumatic migration experiences of immigrant Latinas are uniquely pervasive and brutal and are not typically surveyed on other trauma history measures, but only a handful of studies focused specifically on the migration experiences of women (Kaltman et al. 2010, 2011; Valdez et al. 2013). Yet, none of those studies focused on Latina perinatal immigrant women.

To address the limitations of the current literature, we developed the Migration Experiences Survey (MES), guided by a conceptual theoretical framework that identifies culturally relevant contributors to perinatal depression in Latinas (Lara-Cinisomo et al. 2016a). The purpose of the MES is to assess migration experiences, defined here as experiences during the process of migration and deportation fears after migration to the U.S. Data collected from this survey can help to advance the field's understanding of the role that migration experiences and deportation fears play in perinatal mental health among immigrant Latinas. Thus, this exploratory pilot study was guided by two specific aims. The first was to assess the feasibility and acceptability of gathering data on migration experiences using a newly-developed

measure in a small sample of immigrant Latinas. The second aim was to explore associations between those experiences and perinatal depressive and anxiety symptoms.

Methods

Procedures

Women were recruited during routine prenatal visits and at community centers by trained bilingual (Spanish- and English-speaking) Latina research assistants as part of a larger study on depression and hormone function (Lara-Cinisomo et al. 2016b). To be eligible to participate in this study, women had to meet the following criteria: self-identify as Latina born either in a Latin American country or in the U.S.; be in the third trimester of pregnancy; have a singleton pregnancy; be able to read, write, and speak English or Spanish; and be willing to be followed until 8 weeks postpartum.

Women who were eligible for the study were invited to an enrollment interview, which was conducted in person during the third trimester of the participant's pregnancy. The 8-week postpartum interview was conducted in person at the hospital, where recruitment was carried out. To reduce potential sources of bias due to loss-to-follow up, contact was made with participants after the delivery and at 4 weeks postpartum. Several attempts were made to reach participants by phone or email who appeared to be lost to follow-up. The figure below shows the number of participants lost prior to the 8-week visit. Participants received \$50 upon completion of the enrollment visit and \$60 and an infant blanket at the end of the 8-week visit.

The study was conducted in Chapel Hill, North Carolina, between July 2013 and April 2014. The short recruitment period was a function of time constraints on funding. The Institutional Review Board (IRB) at the university where the study was conducted approved the study. Given the sensitivity of the data collected, written consent was obtained, and a certificate of confidentiality was provided. Prior to securing consent, participants were informed about the type of questions involved in the study, including depression, anxiety and migration-related experiences. Women were informed that they could withdraw from the study at any point without consequence to their care. They were also informed that they could refuse to answer any questions. All study activities were performed in accordance with the ethical standards specified in the 1964 Declaration of Helsinki and its later amendments. To protect participants' identities, de-identified numbers were assigned to all participants and data were tracked using these numbers. Data were entered into a password-protected computer located in a locked office by

an IRB-certified and trained research assistant on the team. De-identified data were stored in a locked cabinet separately from signed consent forms.

Measures

Data on each participant's age, marital status, highest level of education, and annual family income were collected at enrollment to describe the sample.

Migration experiences are defined as exposure to events during entry into the U.S. and perceived threat of deportation during the sojourn and while living in the U.S. (see "Appendix"). These experiences were gathered using the Migration Experiences Survey (MES), a tool developed by the lead author, which is guided by a conceptual theoretical framework that suggests that culturally relevant stressors, such as migration trauma and threat of deportation are directly and indirectly associated with postpartum depression (Lara-Cinisomo et al. 2016a). The MES is designed to capture mode of entry into the U.S., perceived and experienced stressful life events among immigrants who crossed the border, and perceived threat of and experienced deportations among respondents. The measure was not intended to assess acculturation or acculturative stress; rather, the aim of this measure is to fill a gap in the literature on specific experiences related to entry into the U.S. and to capture deportation fears. The MES is a Spanish- and English-language instrument developed based on other studies of migration experiences (Donato and Patterson 2004) and on a standardized instrument measuring traumatic life experiences, such as exposure to sexual and physical assault (Leserman et al. 1997). Other items were developed based on the cited literature and migration studies, including risk factors that may increase individuals' risk of poor mental health (e.g., deportation fears). Using a 3-point Likert scale (response options: *not at all worried*, *somewhat worried*, or *very worried*), participants also rate the extent to which they feared or experienced physical assault, sexual assault, robbery, and rape during migration. The frequency and severity of experienced incidents are also captured. Additionally, because of racial profiling, all participants report whether they worry about deportation (of themselves or their family). Finally, an optional open-ended item allows participants to provide any additional information they wish to share. Data on migration experiences were gathered at the 8-week postpartum visit; this timing allowed the research team to develop a rapport with participants prior to collecting these data.

The instrument was developed in English, then translated by a native Spanish-speaking research assistant with extensive translation experience and research training. The translation was verified by the lead author and the project coordinator both of whom are native Spanish speakers and

proficient in English. Given the sensitivity of the data collected, the instrument was designed to be administered by a trained investigator or research assistant. To ensure that participants felt comfortable responding to sensitive questions regarding migration experiences and deportation fears, interviewers reviewed the certificate of confidentiality with participants to remind women that their participation was voluntary and made sure that the women could see what was being recorded on the paper and pencil survey. Participants were also informed that disclosure of identity would require their permission or when required by federal law, such as required reporting of communicable diseases, which was not collected and therefore not a threat. Additionally, the door to the interview room was closed during data collection and no other staff were allowed to enter. Interviewers were also required to familiarize themselves with the sequence of the survey items to ensure that the interview proceeded smoothly. Finally, interviews were always conducted in the participants' preferred language.

Depressive symptoms were assessed at enrollment and 8 weeks postpartum using the English- and Spanish-validated Edinburgh Postnatal Depression Scale (EPDS; Cox et al. 1987; Garcia-Esteve et al. 2003), a 10-item instrument that is widely used to assess the presence of depressive symptoms post-delivery and has been shown to be valid during the prenatal period (Kozinszky and Dudas 2015). Responses are based on a 4-point scale (0, 1, 2, or 3), with some items reverse-scored, and scores are summed to produce a total score ranging from 0 to 30. In this study, elevated depressive symptoms were determined using a cutoff of EPDS score ≥ 10 , which is the recommended threshold to capture minor and major depression (Cox et al. 1996). This cutoff score has been shown to be a reliable threshold for English- and Spanish-speaking Latina women in the perinatal period (Howell et al. 2012; Lara-Cinisomo et al. 2017a). The EPDS has high internal consistency (Cronbach's $\alpha = .91$), including when used with Spanish-speaking women (Alvarado et al. 2015).

The State-Trait Anxiety Inventory (STAI) was used to assess anxiety symptoms (Barnes et al. 2002; Spielberger et al. 1971). This 40-item instrument measures trait (general tendency to) and state (current) anxiety using two subscales. Trait anxiety represents an individual's tendency to respond with apprehension, whereas state anxiety represents stressors experienced by the individual (Barnes et al. 2002). Trait anxiety is captured using 20 items focusing on how the participant generally feels, and items are rated on a four-point Likert scale from 1 (*almost never*) to 4 (*almost always*). Nine items are reverse-scored before summing all 20 items to obtain a total trait subscale score, with scores ranging from 20 to 80. The state anxiety subscale requires the participant to rate how they feel 'right now ... at this moment'

about 20 items (e.g., 'tense,' 'at ease'), which are rated on a four-point scale from 1 (*not at all*) to 4 (*very much so*). Half of the items are reverse-scored before summing all responses to produce a total state subscale score ranging from 20 to 80. In this study, the STAI was administered at each time point using the English or Spanish version of the validated measure (Spielberger et al. 1970, 1971). Internal consistency coefficients for the subscales range from .87 to .93 (Barnes et al. 2002; Guillen-Riquelme and Buena-Casal 2014). This instrument has been found to be reliable for use with perinatal women, including Latinas (Meades and Ayers 2011; Lara-Cinisomo et al. 2017b). The recommended cutoff score to detect high versus low anxiety is 40 (Dennis et al. 2013; Julian 2011) and has been used with Latinas in the perinatal period (Lara-Cinisomo et al. 2017b).

Data Analyses

Summary statistics for participants' demographic characteristics and their responses to questions on their migration experiences were computed in the form of frequencies and percentages. Responses regarding safety concerns during migration were dichotomized (*not at all worried* vs. *somewhat worried/very worried*). Missing data were not imputed or replaced due to the small number of cases. Instead, missing data are reported in the tables. Because of the small sample size, nonparametric tests were implemented. In addition, outcomes and exposures were not defined due to the exploratory nature of the study. Fisher's exact test was used to assess associations between dichotomous variables (e.g., elevated depressive symptoms, high anxiety, and fear of deportation). Point-biserial Spearman correlations were computed to test for associations between dichotomous and continuous variables. Finally, Kruskal–Wallis tests were used to explore associations between continuous dependent variables (e.g., anxiety score) and categorical independent variables (e.g., fear of deportation). Given the exploratory nature of this study, we did not control for multiple comparisons, and the threshold for significance was set at $\alpha \leq .05$. Analyses were conducted using SPSS version 23 (IBM Corp 2015).

Results

Sixty-five women were screened and 34 were enrolled in the study; four immigrant women were lost to follow-up prior to the 8-week visit (see Fig. 1). Thirty women (25 immigrant and five U.S.-born) attended the 8-week postpartum visit and all immigrants were administered the MES. Demographic characteristics of the 25 immigrant women are reported in Table 1. Most women were married or cohabiting, not

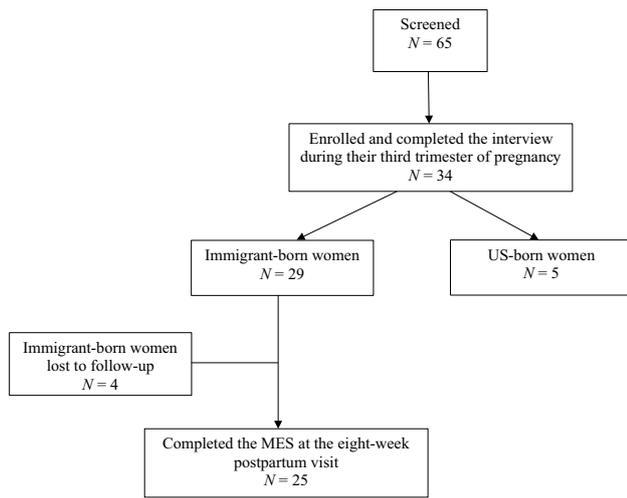


Fig. 1 Flow chart showing participant enrollment and interview completion. *MES* Migration Experiences Survey

Table 1 Demographic characteristics of participants who completed the MES (N = 25)

Variables	Frequency (%) / M (SD)
Marital status	
Married/cohabiting	20 (80%)
Single	5 (20%)
Employment status	
Not employed	20 (80%)
Employed	5 (20%)
Annual family income^a	
Less than \$20,000	12 (52%)
\$20,000 or more	11 (48%)
Education	
Less than high school	16 (64%)
High school or more	9 (36%)
Elevated depressive symptoms	
Enrollment	6 (24%)
8 weeks postpartum	4 (16%)
High state anxiety symptoms	
Enrollment	9 (36%)
8 weeks postpartum	5 (20%)
High trait anxiety symptoms at enrollment	6 (24%)
Age in years, M (SD)	30.44 (5.52)

^aBased on 23 participants

employed at enrollment, and had earned less than \$20,000 in the previous year and had less than a high school education; the mean age was 30.44 (SD = 5.52). In total, 24% of participants at enrollment and 16% at 8 weeks postpartum had elevated depressive symptoms (EPDS ≥ 10). A slightly higher proportion had high state anxiety (STAI ≥ 40), 36%

at enrollment and 20% at 8 weeks postpartum. Participants were willing to complete the MES regardless of depressive and anxiety symptoms.

Table 2 shows the migration-related demographic characteristics of women who completed the MES. The mean age at migration was 18.72 years (SD = 5.47) and the mean number of years in the U.S. among immigrant women was 11.50 (SD = 5.06). Most were interviewed in Spanish and were born in Mexico. Among participants who had migrated to the U.S. without legal documentation, most (n = 17; 85%) hired a *coyote*. A family member accompanied more than half of the women who had crossed the border. Among participants who had crossed the border, 70% worried about apprehension and at least 40% had worried about being robbed, physically or sexually assaulted, or raped. One woman was robbed, and another was robbed and physically assaulted (results not shown). As Table 2 also shows, of the participants who completed the fear of deportation section of the MES, 50% (n = 12) worried about being deported and more than half worried about family deportation (71%). Of the participants who worried about family deportation (n = 17), 52% worried about spousal deportation (results not shown).

Based on proportions reported in Table 2, results from Fisher’s exact tests indicated that a significant association exists between border crossing and fear of deportation (p = .047; 60%). Women worry about being apprehended while crossing the border and current deportation fears (p = .048; 70%). Concern about being physically assaulted during migration was significantly associated with fear being deported (p = .038; 36%) and fears of family deportation (p = .012; 45%). Finally, worries about being raped while crossing the border were associated with fears of being deported (p = .016; 38%) and family deportation fears (p = .039; 43%). No other significant associations were observed.

Associations Between Migration Experiences and Perinatal Mental Health

As shown in Table 3, women who feared deportation exhibited higher mean depressive scores at enrollment (M = 7.92, SD = 5.82) and the 8-week postpartum visit (M = 4.75, SD = 4.69) compared to women who did not fear deportation (M = 3.38, SD = 2.51, and M = 2.67, SD = 3.11, respectively), although these differences were not statistically significant. Similarly, women who worried about a family member being deported exhibited higher mean prenatal and 8-week postpartum depression scores (M = 7.12, SD = 5.10, and M = 4.35, SD = 4.26, respectively) compared to women who were not worried about family deportation (M = 2.86, SD = 2.41, and M = 2.14, SD = 3.18, respectively). A similar pattern emerged in the anxiety data, with women who were

Table 2 Migration-related experiences and deportation fears (N=25)

Characteristics	Frequency (%) / M (SD)
Age at migration (years)	18.72 (5.47)
Number of years in U.S.	11.50 (5.06)
Preferred interview language	
Spanish	23 (92%)
English	2 (8%)
Country of birth	
Mexico	20 (80%)
Other Latin American country	5 (20%)
Form of entry to U.S.	
Border crossing	20 (80%)
Legal sponsorship	1 (4%)
Temporary visa	3 (12%)
Student visa	1 (4%)
Who helped cross the border (n=20) ^a	
Alone	1 (5%)
Accompanied by family member	2 (10%)
Guided by <i>coyote</i>	8 (40%)
Accompanied by family member and guided by <i>coyote</i>	9 (45%)
Worried about personal safety during border crossing (n=20) ^a	
Apprehension	14 (70%)
Robbery	9 (45%)
Physical assault	9 (45%)
Sexual assault	10 (50%)
Rape	9 (45%)
Fears of deportation (n=24) ^b	
Worry about self being deported	12 (50%)
Worry about family member being deported	17 (71%)

^aAmong those participants who crossed the border; responses not mutually exclusive

^bTwo different women were missing data for one of the two items

Table 3 Fear of deportation by mean (SD) depressive symptoms and anxiety scores

	Fear of deportation (n=24) ^a		Fear of family deportation (n=30)	
	No	Yes	No	Yes
Depressive symptoms score				
Prenatal	3.38 (SD=2.51)	7.92 (SD=5.82)	2.86 (SD=2.41)	7.12 (SD=5.10)
8 weeks postpartum	2.67 (SD=3.11)	4.75 (SD=4.69)	2.14 (SD=3.18)	4.35 (SD=4.26)
State anxiety score				
Prenatal	26.92 (SD=7.45)	42.42 (SD=11.17)***	25.71 (SD=6.40)	38.35 (SD=12.22)*
8 weeks postpartum	25.17 (SD=6.90)	31.33 (SD=11.19)	24.71 (SD=7.82)	29.71 (SD=10.80)
Trait anxiety score	28.25 (SD=5.80)	39.67 (SD=11.19)*	25.50 (SD=4.79)	37.00 (SD=10.47)*

*** $p \leq .01$, * $p \leq .05$

^aTwo different women were missing data for one of the two items

afraid of deportation exhibiting higher mean state and trait anxiety scores (see Table 3). Women who were afraid of family deportation also exhibited higher mean prenatal state anxiety scores.

No significant associations between depression scores and fears of being deported were observed. However, significant correlations between fear of being deported and prenatal state anxiety score ($r = .669$, $p < .001$) and trait anxiety score ($r = .567$, $p = .018$) were found. Prenatal depressive

symptoms and fears of family deportation were significantly associated ($r = .433$, $p = .035$). Prenatal state anxiety was also significantly correlated with fear of family deportation ($r = .517$, $p = .010$) as was trait anxiety ($r = .511$, $p = .036$). Results from the Kruskal–Wallis tests confirmed most significant bivariate correlations (see Table 3). Women who feared deportation exhibited significantly higher mean prenatal state anxiety scores [H (1): 10.299, $p = .001$] compared to women who did not ($M = 42.42$, $SD = 11.17$, vs. $M = 26.92$, $SD = 7.45$, respectively). Women who feared being deported also had significantly higher trait anxiety scores [H (1): 5.139, $p = .023$] that women were not afraid ($M = 39.67$, $SD = 11.19$ and $M = 28.25$, $SD = 5.80$, respectively). Similarly, women who worried about a family member being deported exhibited significantly higher mean prenatal anxiety scores [H(1): 6.154, $p = .013$] compared to women who did not ($M = 38.35$, $SD = 12.22$ and $M = 25.71$, $SD = 6.40$, respectively). Trait anxiety was also significantly associated with fears of family deportation [H (1): 4.174, $p = .041$], with women with such fears exhibiting higher mean scores than women who did not ($M = 37.00$, $SD = 10.47$ vs. $M = 25.50$, $SD = 4.79$, respectively). Associations between prenatal depressive symptoms and fears of family deportation trended toward significant [H (1): 3.513, $p = .061$].

Discussion

In addition to being feasible, the MES was found to be an acceptable measure for the assessment of migration experiences and deportation fears in our sample of immigrant Latinas. The MES also yielded important information about migration-related experiences in women in our study. We found that nearly half of women participating in our study who had crossed the border worried about their safety. The results also showed that 50% worried about deportation and 70% worried about deportation of a family member.

While mean depressive symptom scores were higher among women with fears of deportation than among women without such fears, this difference was not statistically significant, likely because most of the women in our sample did not exhibit depressive symptoms when the MES was administered. Another explanation for the lack of significant associations is the small sample size. Future studies using the MES should recruit a larger sample of immigrant women with and without depressive symptoms.

Anxiety and deportation fears were significantly associated. Mean prenatal state and trait anxiety scores were significantly higher among women who were afraid of deportation. Fear of family deportation was also significantly associated with higher prenatal state and trait anxiety. While the directionality of causation cannot be established because

of the timings of assessments, these associations suggest that immigrant Latina women who suffer from anxiety might be at an increased risk of elevated fear of deportation. While research in this area is limited, previous studies suggest that anti-immigrant policies increase the risk of anxiety in immigrant and U.S.-born Latinos (Crocker 2015; Hacker et al. 2011; Joseph 2011; Salas-Wright et al. 2015). Given that fear of deportation can negatively impact daily functioning (Ayón 2017) and new mothers already experience high levels of daily demands, further exploration on how increased anxiety and fear of deportation affect maternal caregiving and overall maternal wellbeing will be important. Because we observed significant differences in prenatal anxiety between women with deportation fears compared to women without such fears, future studies should also assess these concerns and the presence of anxiety during the prenatal period and post-delivery to determine the directionality of causation. Related, future studies should assess other stressors related to women's migration fears before pregnancy (e.g., fears of leaving family behind, safety threats in their home country, etc.) because they can increase risks of poor maternal and child outcomes (Crocker 2015; Joseph 2011). Post-migration fears, such as deportation threats, might be heightened postpartum because women worry about the safety and wellbeing of their infant and other family members during this time (Valdez et al. 2013). Assessing deportation fears with anxiety over time could also help with the development of interventions and support services designed to reduce anxiety in postpartum Latinas.

The results showed that fear of deportation while crossing the border persisted into the postpartum period, when the MES was administered. Prior studies have suggested that early migration-related fears have potential lingering negative effects (Lopez and Boie 2012), and our results support these findings. Concerns during migration regarding physical safety were also associated with deportation fear. For instance, women who worried about rape while crossing the border were significantly more likely to fear deportation and to worry about deportation of a family member. Similarly, women who were concerned about physical assault during migration were significantly more likely to worry about deportation threats. These findings highlight the importance of investigating physical and psychological safety concerns in immigrant Latinas who cross the border or have family members who are undocumented, in addition to the lasting effects of harboring such concerns, particularly given the importance of maternal psychological and perceived physical wellbeing.

While the present study represents some important contributions to the field, certain limitations should be addressed. For example, to better assess whether deportation fears are associated with perinatal depressive symptoms, future studies should include a larger sample of

immigrant women and an equal number of women with and without depressive symptoms, for a more robust comparison and increase external validity. A larger sample will also allow investigators to confirm the results on anxiety and deportation fears. Because the current study used a convenience sample, the result cannot be generalized to all immigrant Latinas, including women who crossed the border. To increase generalizability and power, future studies should include 128 women, which ensures 80% power to detect significant associations between anxiety and deportation fears. Subsequent studies should also explore the feasibility and acceptability of the MES with other immigrant populations. This instrument was pilot tested with adult English- and Spanish-speaking postpartum Latinas. However, pre-testing with a representative sample of Latinas was not conducted nor were cognitive interviews. Therefore, future studies should conduct cognitive interviews to assess how participants mentally process and respond to items in the MES. Also, future studies should test associations between language preference, migration experiences, and deportation fears; our sample did not allow for such analyses. Subsequent studies should also assess whether the MES is appropriate for use with other age groups and with men. Furthermore, subsequent studies should evaluate whether the mode of data collection (e.g., pencil and paper vs. computer-based survey; self-administered vs. interviewer-administered) influences the acceptability of the measure. The MES should be administered during the prenatal and postpartum periods to allow investigators to determine the directionality of causation in the associations revealed here, and to ascertain whether perceptions of migration experiences and fears of deportation change over time and whether migration experiences have lingering effects. Related, posttraumatic stress disorder associated with migration experiences should be assessed to determine the lasting effects of traumatic events experienced during migration. Finally, this study did not establish reliability or validity of the MES. Thus, future studies should determine the psychometric properties of the MES. The content and construct validity will be of importance for establishing the value of the MES.

Conclusions

Unlike other migration surveys, the MES enables systematic assessment of migration experiences and deportation fears in immigrant postpartum Latinas. The MES can help address the areas for further research proposed above and to advance the field's understanding of the impact of migration experiences on maternal depression and anxiety. The MES captures complex migration-related experiences not currently

assessed in the literature (e.g., border crossing experiences and fears) that will allow investigators to understand the events experienced during migration.

This study demonstrated the feasibility of the MES and participants' willingness to share their migration experiences. We found the survey easy to administer, and participants were willing to answer all our questions regardless of immigration status and presence of depressive symptoms. Researchers should consider the research setting when administering this instrument. We believe that providing a safe environment for the administration of this sensitive survey encouraged women in our study to complete it. Additionally, interviewers reminded women of the confidentiality of their responses prior to administering the survey, and the room where the interview was conducted remained closed to other staff, allowing for the necessary privacy. The timing of the interview is also important; the MES was administered once rapport and trust had been established. Previous studies have demonstrated that concerns about confidentiality limit research participation among Latinos (Reidy et al. 2012). Finally, the data collected should be carefully guarded using secure data management procedures (e.g., de-identification and password encryption) to ensure participants' privacy, safety, and confidentiality. These practices will help ensure the success of all studies and increase engagement in immigrant Latinas.

This study demonstrates the importance of studying the relationship between migration experiences and deportation fears among immigrant prenatal and postpartum Latinas. This work also highlights important dimensions of vulnerability in this understudied population, particularly during a time when the social-political climate challenges the safety and mental health of these women.

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Compliance with Ethical Standards

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

Appendix

Migration Experiences Survey (MES)

Thank you for agreeing to complete this survey. As stated in the consent form you signed when you enrolled in the study and as I stated at the start of today's visit, none of the information you share today will be associated with your name, phone number or other identifying information. The information we collect today is solely for research purposes. We will not share your individual information with anyone outside the research team and any data that reported will be at the group level.

Background information and mode of entry

1. Where were you born? _____
If foreign born, go to Q2.
Others, Deportation section (Q40)
2. When did you immigrate to the US? Year: _____
3. How old were you when you immigrated to the US? Age: _____
4. How did you enter the US...?
 - a. crossed border [unauthorized entry] (go to Q4a)
 - b. had someone else's visa [unauthorized entry] (go to Q4a)
 - c. had temporary tourist visa [legal entry] (go to Q5)
 - d. family legal sponsorship [legal entry]
 - e. Other: specify
- 4a. When you crossed the border, who helped you...?
 - a. alone
 - b. with a friend
 - c. with a family member
 - d. used a coyote
 - e. family and coyote
5. While crossing the border, how worried were you about being apprehended?
 - a. Very worried
 - b. Somewhat worried
 - c. Not at all worried
6. While crossing the border, were you apprehended?
 - a. Yes
 - b. No

Physical assault

7. While crossing the border, how worried were you about being physically assaulted or attacked?
- Very worried
 - Somewhat worried
 - Not at all worried
8. While crossing the border, were you physically assaulted or attacked?
- Yes
 - No (**go to Q14**)
9. How many times (different days) did this happen during the border crossing? Circle number below.
- 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more
10. And when this happened, were you ever afraid that you might be killed or seriously injured?
- Yes
 - No
11. When this incident happened, did you suffer:
- No physical injuries..... 0
- Minor physical injuries (such as bruises and cuts not needing stitches)..... 1
- Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2
12. Can you please briefly describe that experience: _____
- _____
- _____
13. Please indicate who did this. (Circle all that apply.)
- Coyote
 - Friend
 - Spouse
 - Family member
 - Male crossing
 - Female crossing
 - Other: specify
14. While crossing the border, did you witness someone being physically assaulted or attacked?
- Yes
 - No

Sexual assault

15. While crossing the border, how worried were you about having the sex organs on your body being touched by force or threat? By touch we mean with hands, mouth, or objects on your sex parts, that is breasts, vagina, pubic area or anus.

- a. Very worried
- b. Somewhat worried
- c. Not at all worried

16. While crossing the border, did anyone ever touch the sex organs of your body by using force or threatening to harm you?

- a. Yes
- b. No

17. While crossing the border, did anyone ever make you touch the sex organs of their body by using force or threatening to harm you? By touch we mean with hands, mouth, or objects on their sex parts.

- a. Yes
- b. No (go to Q23)

18. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

19. And when this happened, were you ever afraid that you might be killed or seriously injured?

- a. Yes
- b. No

20. When this incident happened, did you suffer:

No physical injuries..... 0
 Minor physical injuries (such as bruises and cuts not needing stitches)..... 1
 Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

21. Can you please briefly describe that experience: _____

22. Please indicate who did this. (Circle all that apply)

- a. Coyote
- b. Friend
- c. Spouse
- d. Family member
- e. Male crossing
- f. Female crossing

g. Other: specify

23. While crossing the border, did you witness someone being sexually assaulted?

- a. Yes
- b. No

Rape

24. While crossing the border, how worried were you about being raped? By rape we mean penetration or intercourse by force.

- a. Very worried
- b. Somewhat worried
- c. Not at all worried

25. While crossing the border, were you raped or forced to have intercourse?

- a. Yes
- b. No (**go to Q 31**)

26. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

27. And when this happened, were you ever afraid that you might be killed or seriously injured?

- a. Yes
- b. No

28. When this incident happened, did you suffer:

No physical injuries..... 0
 Minor physical injuries (such as bruises and cuts not needing stitches)..... 1
 Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

29. Can you please briefly describe that experience: _____

30. Please indicate who did this. (Circle all that apply.)

- a. Coyote
- b. Friend
- c. Spouse
- d. Family member
- e. Male crossing
- f. Female crossing

g. Other: specify

31. While crossing the border, did you witness someone being raped or forced to have intercourse?
- Yes
 - No

Robbery

32. While crossing the border, how worried were you about having your money or personal belongings stolen?
- Very worried
 - Somewhat worried
 - Not at all worried

33. While crossing the border, was your money or any personal belonging stolen?
- Yes
 - No (**go to Q 39**)

34. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

35. And when this happened, were you ever afraid that you might be killed or seriously injured?
- Yes
 - No

36. When this incident happened, did you suffer:

No physical injuries..... 0

Minor physical injuries (such as bruises and cuts not needing stitches)..... 1

Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

37. Can you please briefly describe that experience: _____

38. Please indicate who did this. (Circle all that apply.)

- Coyote
- Friend
- Spouse
- Family member
- Male crossing

- f. Female crossing
- g. Other: specific

39. While crossing the border, did you witness someone being physically assaulted or attacked?

- a. Yes
- b. No

Deportation

Before we move to the next set of questions, I want to remind you that all of the information we collect from you will be kept confidential. Your name and other personal information will not be kept with the information you share today.

40. Do you have any fears of being deported (ASK EVERYONE THIS QUESTION)?

- a. Yes
- b. No

41. Do you have fears about a family member being deported (ASK EVERYONE THIS QUESTION)?

- c. Yes (**go to Q 41a**)
- d. No

41a. Who do you worry will be deported?

- a. Spouse/partner
- b. Parent
- c. Child
- d. Relative living in same household
- e. Relative not living in same household

42. Has a member of your family ever been deported?

- a. Yes (**go to Q 42a**)
- b. No

42a. Who was deported (CHECK ALL THAT APPLY)?

- a. Spouse/partner
- b. Parent
- c. Child
- d. Relative living in same household
- e. Relative not living in same household

43. Have you ever been deported?

- c. Yes (**go to Re-entry section**)
- d. No (**go to Q 83**)

Re-entry

44. Have you returned to (country of origin)?
- Yes (**GO TO NEXT QUESTION**)
 - No (**go to Q 83**)
45. When did you return to the US? Year: _____
46. How old were you returned to the US? Age: _____
47. How did you re-enter the US...?
- crossed border [illegal entry] (**go to Q 47a**)
 - had someone else's visa [illegal entry] (**go to Q 47a**)
 - had temporary tourist visa [legal entry] (**go to Q 48**)
 - family legal sponsorship [legal entry]
- Other: specify
- 47a. When you crossed the border, who helped you...?
- alone
 - with a friend
 - with a family member
 - used a coyote
 - family and coyote
48. While crossing the border, how worried were you about being apprehended?
- Very worried
 - Somewhat worried
 - Not at all worried
49. While crossing the border, were you apprehended?
- Yes (**GO BACK TO "RE-ENTRY" AND FOLLOW SEQUENCE**)
 - No

Re-entry Physical assault

50. While crossing the border, how worried were you about being physically assaulted or attacked?
- Very worried
 - Somewhat worried
 - Not at all worried
51. While crossing the border, were you physically assaulted or attacked?
- Yes
 - No (**go to Q 57**)

52. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

53. And when this happened, were you ever afraid that you might be killed or seriously injured?

- a. Yes
- b. No

54. When this incident happened, did you suffer:

No physical injuries..... 0

Minor physical injuries (such as bruises and cuts not needing stitches)..... 1

Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

55. Can you please briefly describe that experience: _____

56. Please indicate who did this. (Circle all that apply.)

- a. Coyote
- b. Friend
- c. Spouse
- d. Family member
- e. Male crossing
- f. Female crossing
- g. Other: specify

57. While crossing the border, did you witness someone being physically assaulted or attacked?

- a. Yes
- b. No

Re-entry Sexual assault

58. While crossing the border, how worried were you about having the sex organs on your body being touched by force or threat? By touch we mean with hands, mouth, or objects on your sex parts, that is breasts, vagina, pubic area or anus.

- a. Very worried
- b. Somewhat worried
- c. Not at all worried

59. While crossing the border, did anyone ever touch the sex organs of your body by using *force or threatening to harm you*?

- a. Yes
- b. No

60. While crossing the border, did anyone ever make you touch the sex organs of their body *by using force or threatening to harm you?* By touch we mean with hands, mouth, or objects on their sex parts.

- a. Yes
- b. No (**go to Q 66**)

61. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

62. And when this happened, were you ever afraid that you might be killed or seriously injured?

- a. Yes
- b. No

63. When this incident happened, did you suffer:

No physical injuries..... 0
 Minor physical injuries (such as bruises and cuts not needing stitches)..... 1
 Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

64. Can you please briefly describe that experience. _____

65. Please indicate who did this. (Circle all that apply.) *If no unwanted or forced sexual experiences, go to question 67.*

- a. Coyote
- b. Friend
- c. Spouse
- d. Family member
- e. Male crossing
- f. Female crossing
- g. Other: specify

66. While crossing the border, did you witness someone being sexually assaulted?

- a. Yes
- b. No

Re-entry Rape

67. While crossing the border, how worried were you about being raped? By rape we mean penetration or intercourse by force.

- a. Very worried
- b. Somewhat worried
- c. Not at all worried

68. While crossing the border, were you raped or forced to have intercourse?

- a. Yes
- b. No (**go to Q 74**)

69. How many times (different days) did this happen during the border crossing? Circle number below.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

70. And when this happened, were you ever afraid that you might be killed or seriously injured?

- a. Yes
- b. No

71. When this incident happened, did you suffer:

No physical injuries..... 0

Minor physical injuries (such as bruises and cuts not needing stitches)..... 1

Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

72. Can you please briefly describe that experience: _____

73. Please indicate who did this. (Circle all that apply.)

- a. Coyote
- b. Friend
- c. Spouse
- d. Family member
- e. Male crossing
- f. Female crossing
- g. Other: specify

74. While crossing the border, did you witness someone being raped or forced to have intercourse?

- a. Yes
- b. No

Re-entry Robbery

75. While crossing the border, how worried were you about having your money or personal belongings stolen?
- a. Very worried
 - b. Somewhat worried
 - c. Not at all worried

76. While crossing the border, was your money or any personal belonging stolen?
- a. Yes
 - b. No (**go to Q 82**)

77. How many times (different days) did this happen during the border crossing? Circle number below.
- 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 or more

78. And when this happened, were you ever afraid that you might be killed or seriously injured?
- a. Yes
 - b. No

79. When this incident happened, did you suffer:
- No physical injuries..... 0
- Minor physical injuries (such as bruises and cuts not needing stitches)..... 1
- Serious physical injuries (stitches, broken nose, broken bones, or hospitalization).. 2

80. Can you please briefly describe that experience: _____

81. Please indicate who did this. (Circle all that apply.)
- a. Coyote
 - b. Friend
 - c. Spouse
 - d. Family member
 - e. Male crossing
 - f. Female crossing
 - g. Other: specific

82. While crossing the border, did you witness someone being physically assaulted or attacked?
- a. Yes
 - b. No

CLOSING SECTION

83. Is there anything else you would like to share about your experience immigrating to the U.S.?

Those are all of my questions. I want to thank you for talking with me today about your experience immigrating to the US. As we said at the start of the interview, all of the information you provided will be kept confidential and no identifying information was recorded on this survey. Your personal information (e.g., name, phone number, etc.) will not be associated with the ID number on this survey.

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