

Manuscript Title: Anxiety among Black and Latina Mothers of Premature Infants at Social-Environmental Risk

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ABSTRACT

Anxiety is heightened for mothers of premature infants, potentially interfering with early mothering. This study describes relationships among race/ethnicity, language, and anxiety for women at social-environmental risk who deliver a premature infant. Postnatal baseline interview data from a randomized trial testing a behavioral intervention for mothers and infants (29-34 weeks gestational age) were used to examine maternal state (STAI-Y1) and trait (STAI-Y2) anxiety among blacks and Latinas, and by language preference. Latinas ($n = 97$) had an elevated prevalence of high (≥ 40) state anxiety compared to blacks ($n = 97$), with Latinas preferring a Spanish to an English interview reporting the highest levels of state anxiety. Trait anxiety did not differ across groups. Culturally appropriate interventions are needed to reduce anxiety among Latina mothers delivering premature infants, especially among those with limited English language proficiency. A racially/ethnically diverse workforce, bilingual healthcare providers, and trained medical interpreters may help to ensure better outcomes.

INTRODUCTION

Mothers of premature infants often experience psychological distress characterized by increased anxiety and depression during the first year after delivery, and their symptoms persist through 24 months corrected age.¹⁻⁴ Maternal anxiety is related to several infant and parenting outcomes, including: worry about the premature infant and loss of the expected mothering experience, negative mother-child interaction and poor child health and development.⁵⁻⁸ Social-environmental risk factors (e.g., minority status, poverty, low education) may further intensify maternal anxiety which can interfere with early mothering and exacerbate parenting difficulties.^{5, 8-10} Few studies have compared reported anxiety among mothers with premature infants across racial/ethnic groups and language preferences (language preference refers to the language in which the mother chose to participate in the interview). The purpose of this study is to describe the relationships among anxiety, race/ethnicity, and language preference, among mothers of premature infants.

Anxiety is very common among women, with reports indicating that 1 in 3 women will experience some type of anxiety disorder within their lifetime.^{11, 12} There are two facets of anxiety that are typically measured in research studies – trait or usual anxiety, which is defined as how a respondent generally feels, and state or current anxiety, which is defined as how a respondent feels at that moment. Many women are especially likely to report state or generalized anxiety following the birth of a child, with estimates of incidence ranging from 6.1% to 27.9%.^{13,}

¹⁴ Risk factors for maternal anxiety include less support, stressful life events, and perinatal medical complications.⁴ One study identified antecedents of maternal anxiety among mothers of healthy term infants, noting that increased anxiety one-month postpartum was significantly associated with high trait anxiety, low education, a history of depressed mood, and a perception

of high peripartum stress.¹⁵ The birth of a premature infant also represents an added stressor to many parents. Findings from three studies reveal that mothers of premature infants significantly differ from mothers of full-term infants on state anxiety, with mothers of premature infants reporting higher anxiety.¹⁶⁻¹⁸

The extent to which anxiety levels among mothers of premature infants differ by race and ethnicity and language preference is less understood. Increased attention has been directed towards racial and ethnic differences in health in the U.S. over the last two decades. A growing body of literature has revealed racial and ethnic disparities in a variety of health-related issues, including pathophysiology, stress responses, psychological issues and the quality of communication between patients and healthcare providers.¹⁹ Moreover, Black women and Latina women have higher incidences of premature births in the U.S. compared with White women (18.1, 12.2 and 11.4%, respectively).²⁰ Findings from one study that compared maternal characteristics and psychological stress profiles among Black, White and Latina mothers who delivered premature infants revealed that Black mothers scored significantly lower than White mothers on a state anxiety scale, with Latina mothers reporting the highest state anxiety of all groups.²¹ However, these investigators did not account for primary language in the analysis.

Given the growing proportion of Latinos in the U.S. population,²² it is important to consider maternal language preference when conducting research in perinatal health outcomes and planning interventions to address racial and ethnic disparities. Latina women have the highest birth rates (100.8 per 1000 reproductive-age women, 2006-2008) among all racial/ethnic groups.²³ Previous research that has explored ethnicity and language in health research, in general, has generated inconclusive evidence. In one study of insured adults, health care usage patterns, characterized as physician visits, mental health visits and vaccinations, were not

significantly different between English-speaking Latino adults and non-Latino White adults. However, insured Spanish-speaking Latino adults showed significantly lower health care use than their English speaking Latino peers.²⁴ There is also evidence which shows that English-speaking Latinos are more likely to report mental health problems and postpartum depressive symptoms than Spanish-speaking Latinos.^{25, 26} These findings suggest that Latinas who speak only Spanish may face more difficulty accessing health and social services and communicating with health care providers.

Limited data on racial/ethnic differences in postpartum anxiety following a premature birth, combined with the paucity of data available for understanding differences further by language, represent a gap in knowledge that should be studied. Therefore, the purpose of this study is to describe the relationships among anxiety, race/ethnicity, and language preference for women at high social-environmental risk who have just given birth to premature infants.

METHODS

Participants

Participants were 201 biological mothers of healthy premature infants born between 29 and 34 weeks gestational age who had at least two or more of the following social-environmental risk factors: self-identity as Black or Latina, less than a high school education, less than 18 years of age, a history of or current mental illness, family income less than 150% of the poverty line, more than one child under 24 months, 4 or more children under age 4 in household, and/or residence in a disadvantaged neighborhood. Latina mothers in this study were primarily of Mexican descent (97% of Latinas with a Spanish interview were Mexican and 94% of Latinas

with an English interview were Mexican). The mother-infant dyads were participants in a randomized clinical trial testing a multisensory developmental and participatory guidance intervention for mothers of premature infants. Mothers who lived in an urban area of a midwestern city were recruited after delivering healthy premature infants who were admitted level-2 neonatal intensive care units (NICUs) at one of two community-based hospitals. Infants who had congenital anomalies, necrotizing enterocolitis, brain injury, chronic lung disease, prenatal drug exposure or were HIV positive were excluded from this study. We also excluded mothers who were identified as illicit drug users and mothers who were not the legal guardian of their infants.

This study is a cross-sectional assessment of baseline interview data from the larger trial, and the analysis includes the 194 women who self-identified as Black or Latina ($n = 198$) after excluding those with missing state anxiety scores ($n = 4$).

Procedures

The committees for the protection of human subjects at the university and the two study sites approved the study. Mothers and their infants were enrolled during infant hospitalization when the infant was deemed healthy to participate. After informed consent was obtained, mothers completed an in-person baseline interview with a research team member. Demographic characteristics and psychosocial factors were obtained during the interview. Mothers selected English or Spanish as the preferred language for their interviews and Spanish interviews were conducted by research staff members who are fluent in Spanish.

Measures

Maternal state and trait anxiety were the main outcomes in this study and were assessed using the trait and state subscales of the State-Trait Anxiety Inventory (STAI).²⁷ The STAI has

been used in research and clinical practice to measure state (present) and trait (usual) feelings of apprehension, tension, nervousness, and worry. Weighted scores for 20 items on each scale are added together to give total anxiety scores ranging from 20-80 (most anxious). High reliability was reported (Cronbach alpha = 0.90- 0.93 and test-retest correlations = 0.73 – 0.86).²⁷ Both scales were translated to Spanish in November 2005 by the MAPI Institute²⁸ using two forward translations, one backward translation and a review by a clinician with a sample of patients (MAPI Institute, Personal Communication, January 2012).

Given the highly right-skewed distribution of the scores in our sample, state and trait anxiety were categorized into high (score of 40 or higher) and low/moderate (<40) as previously used in studies of prenatal and postnatal anxiety.^{15, 29, 30}

The main independent variables in this analysis were 1) self-reported race/ethnicity (black or Latina) and 2) Among Latinas only, language preference for the baseline interview (English or Spanish). No black women chose a Spanish interview.

In addition to trait anxiety (as described above), the following maternal and infant factors were examined as covariates: maternal age (<20, 20-24, 25-34, 35+), maternal education [<High School (HS), HS+], parity (primiparous, multiparous), employment before birth of baby (working full or part time vs. not working), school enrollment before birth of baby (enrolled in school vs. not enrolled in school), number of children and adults in the household, living situation (lives with mother or grandmother, baby's father, both, or neither), income (< 185% federal poverty level vs. ≥185% federal poverty level), lives in disadvantaged neighborhood, history of mental illness, symptoms of postpartum depression (PDSS - normal adjustment, significant symptoms, major symptoms), symptoms of depression per the Center for Epidemiologic Studies Depression Scale (CES-D), social support, number of days between

infant's date of birth and interview date, infant sex, gestational age at birth, and newborn risk score.

Neighborhood disadvantage was derived using 5-year estimates (2005-2009) from the American Community Survey at the census tract level.³¹ Mothers' addresses were geocoded to census tracts and the Index of Neighborhood Disadvantage Score³² was calculated for each census tract by first dividing each census tract measure by 10, then subtracting the sum of the percent of mother-headed households and the percent living below the poverty line in the census tract from the sum of the percent of adults >24 years who are college educated and the percent of households in the census tract that were owner occupied and dividing by four. Women's neighborhoods were considered disadvantaged if the INDS was greater than zero.

Three measures were used to measure past and current maternal mental health problems. Past treatment for mental illness or depression was assessed per mother's report and the medical record. Current depressive symptoms were measured using The Center for Epidemiologic Studies Depression Scale (CES-D), a self-report scale assessing the frequency of reported depressive symptoms in a previous week. A score of 16 or higher on this scale indicates symptoms of depression. Maternal postpartum depressive symptoms were also assessed using the Postpartum Depression Screening Scale (PDSS), which is a 35-item, self-report instrument that measures sleeping/eating disturbances, anxiety/insecurity, emotional lability, cognitive impairment, loss of self, guilt/shame, and contemplating harming oneself. A score of 60 or higher indicates postpartum depressive symptoms.

Social support was defined as a composite concept including attachment/intimacy, social integration, nurturance, reassurance of worth, and availability of assistance.³³ It was assessed using the Personal Resource Questionnaire 2000 (PRQ-2000).^{33, 34} The PRQ-2000 measures the

perceived level of actual and potential social support. The instrument is comprised of 15 positively worded items on a 7-point Likert scale. Internal consistency is high ($\alpha = 0.87 - 0.93$). Scores range from 15-105 with higher scores indicating higher support. Social support was categorized for bivariate analysis, with the lowest quartile of the distribution representing low social support (score of < 88) and the higher three quartiles indicating higher social support. The continuous score was used in regression modeling.

The newborn risk score was calculated using the newborn care portion of the Problem-Oriented Perinatal Risk Assessment System (POPRAS) tool, which was completed through infant medical record review.³⁵ For this study, a subset of the items were identified and scored to indicate conditions that would likely have occurred during delivery or very early during the hospital stay (e.g. APGAR 5 min ≤ 5 , respiratory distress syndrome) in order to ensure that the score indicated the infant's health at the time of the interview, and not conditions that would have developed after the measurement of our outcome. This score was treated as a categorical variable (highest quartile = 51+ versus <51) in bivariate analysis with anxiety and as a continuous variable in bivariate analysis with race/ethnicity and language, and in multivariable model-building.

Data Analysis

Bivariate analysis was performed using Chi-square tests of associations (for categorical main effects and covariates) and t-tests (for continuous covariates) to explore differences in proportions and means, respectively, for demographic characteristics by race/ethnicity (i.e., Black vs. Latina mothers), by language preference (Latina-Spanish interviewed mothers vs. Latina-English interviewed mothers) and separately by high vs. low state anxiety. Alpha was set at 0.05 and marginally significant results were reported for $p < 0.10$. Poisson regression with

robust variance was used to estimate crude and adjusted prevalence ratios (PR) and 95% confidence intervals (CI) ³⁶ for the relationships between race/ethnicity, language preference and high state anxiety. Final models were chosen using a manual backward stepwise regression procedure. All covariates that were significantly related to race/ethnicity, language preference or state anxiety in bivariate analysis were included in the full model and variables were removed from the model one at a time in descending order of significance if their *p*-values were > 0.10. All analyses were performed using IBM SPSS Statistics, Version 19.

RESULTS

Demographic & Psychosocial Characteristics

Blacks and Latinas did not differ significantly on maternal education, parity, work status, number of children in the household, income, depression, trait anxiety, timing of interview, infant GA at birth, or newborn risk score. (Table 1). Statistically significant or marginally significant differences between Black and Latina were observed for age, school enrollment, number of adults living in the household, living arrangements, neighborhood disadvantage, postpartum depression, social support, and infant sex. Black mothers were significantly more likely to live with a mother or grandmother, and reside in a disadvantaged neighborhood. Latina mothers were significantly more likely to not be enrolled in school at the time their infant's birth, report living with 4 or more adults in the household, live with the baby's father, and report lower social support and higher state anxiety. When we explored these characteristics by language preference among Latina mothers only (Table 2) we found statistically significant or marginally significant differences for work status, living situation, social support, and state anxiety. Thus, Latina-Spanish interviewed mothers were significantly more likely to not work at the time of

their infant's birth, live with the baby's father, and report lower social support and higher state anxiety. Table 3 also shows the prevalence of high state anxiety in our sample by demographic and psychosocial characteristics. The prevalence of high state anxiety was greatest among mothers who did not live in a disadvantaged neighborhood, those with infants who had high newborn risk scores, and those who reported depressive symptoms, high trait anxiety and low social support.

****Insert Tables 1-3 about here****

Anxiety & Social Support

State anxiety (present), but not trait (usual) anxiety, was significantly different by race and marginally significantly different by language preference among Latinas. Latina mothers who chose a Spanish interview had the highest mean STAI-y1 scores (Table 3) and prevalence of high state anxiety (Figure 1) followed by Latina mothers with an English interview and black mothers (Figure 1).

****Insert Figure 1 about here****

When we used regression modeling to examine this in crude and adjusted models, we noted similar relationships (Table 4). Two analyses were performed, first comparing the prevalence of high state anxiety for Latinas compared to blacks, then for women choosing a Spanish versus an English interview, among the subsample of Latina mothers only. After controlling simultaneously for factors related to race/ethnicity, language preference and/or anxiety, social support was the only factor that was significantly related to state anxiety and retained in the model. The proportion of women reporting high state anxiety was over two times higher for Latina mothers compared to black mothers (Adjusted PR: 2.17; 95% CI: 1.05, 4.50).

Among Latinas, the prevalence of high state anxiety for those choosing a Spanish interview was more than twice that of Latinas choosing an English interview (Adjusted PR: 2.08; 95% CI: 0.76, 5.67), but this estimate was not statistically significant ($p = 0.14$), possibly due to the small sample size among Latinas choosing an English interview. Social support was independently and strongly negatively associated with high state anxiety even after controlling for race/ethnicity and language preference (Table 4).

****Insert Figure 1 about here****

****Insert Table 4 about here****

DISCUSSION

Although we found no significant differences in trait anxiety for blacks compared to Latinas or by language preference among Latinas, Latina mothers who preferred Spanish interviews reported the highest state anxiety. Social support was also independently negatively associated with high state anxiety after controlling for race/ethnicity and language preference. These findings are consistent with previous reports examining anxiety and distress in postpartum study populations. Lau and colleagues²¹ similarly observed no differences in trait anxiety but significant differences in state anxiety among an ethnically diverse sample of mothers of very low birth weight infants. Black mothers reported less state anxiety than White and Latina mothers in their study (mean STAI-y1 scores: 33.3, 39.6, and 40.1, respectively).²¹ In our study, Black mothers similarly reported lower mean scores of state anxiety-compared with Latina-English mothers and Latina-Spanish mothers (mean STAI-y1 scores: 27.2, 31.0, and 33.7, respectively). However, the mean state anxiety scores among all mothers in our sample were much lower than those reported in previous studies with comparable study populations.^{21, 37} It is

possible that Latina mothers report higher state anxiety following the delivery of a premature infant compared with black mothers because surveillance data shows that Latina women have lower rates of premature births relative to blacks in the U.S.²⁰ Thus, they may lack familiarity with prematurity and the neonatal intensive care setting. Furthermore, among Latinas who prefer speaking Spanish, limited English language proficiency may confer further increased risk due to language barriers in the hospital setting where a lack of Spanish-speaking staff and materials that are available in Spanish, might contribute to increased state anxiety.³⁸

Language preference served as a useful distinction in the sub-analysis among Latina mothers. While language preference and high state anxiety were not significantly associated in the regression analysis among Latinas, possibly as a result of sample size limitations, differences in high state anxiety by language preference were marginally significant in bivariate analysis. Spanish-interviewed Latina mothers were more than twice as likely to report high state anxiety as English interviewed Latina mothers (29.7% vs. 13.5%, respectively). Additionally, they were significantly more likely to be older, not work or be enrolled in school at the time of their infant's birth, live with the baby's father, and report lower social support. They were also significantly less likely to live with a mother or grandmother compared to English interviewed Latina mothers. These findings suggest that Spanish-interviewed Latina mothers might be less acculturated, which in turn could contribute to their higher levels of state anxiety. Though our study lacked information about the length of time in the U.S. and residential history of Latina-Spanish interviewed mothers, the demographic and psychosocial profile of these mothers is consistent with other literature that has shown that recent Mexican immigrant women to the U.S. report low levels of social support and are more likely to be married.³⁹ Thus, Spanish-interviewed Latina mothers in our study might be first-generation immigrants who are socially

isolated, lack the proximity and tangible assistance of a mother or grandmother, and largely depend on the baby's father for translation and many of their daily activities. In all, our results suggest that Spanish-interviewed Latina mothers might benefit from additional support services in the NICU and support services outside of the hospital setting. These mothers might also benefit from health providers who can regularly engage with them in their preferred language to share information about the health status of their premature infant, which in turn, could contribute to a reduction in their anxiety levels.

Since the Spanish version of the State-Trait Anxiety Inventory Y1 and Y2 scale has not been formally validated, it is possible that the higher levels of anxiety reported among Latinas interviewed in Spanish can be attributed to an aspect of the translation. However, a rigorous translation procedure was undertaken (MAPI Institute, Personal Communication, January 2012) and our findings revealed significant differences in state anxiety and no differences in trait anxiety between the three groups of mothers, including Latina-Spanish interviewed mothers and Latina-English interviewed mothers. Since the items on the trait and state subscales are very similar and the translation was performed the same way for both scales, we would expect to also see differences in trait anxiety by language preference if the findings were a result of the translation alone. Thus, these findings and important distinctions suggest that Spanish-speaking Latinas may truly have increased anxiety after the delivery of a preterm birth, as compared to their English-speaking counterparts and blacks.

Limitations

There were several limitations of this study. We had a relatively small sample size for Latinas who preferred an English interview, which led to instability in our results when the analysis was conducted with the subset of Latinas only. In addition, the sample size available within Blacks and Latina subgroups was too small to fully explore whether factors most related to anxiety differed across racial/ethnic and language subgroups. As previously mentioned, another major limitation stemmed from a lack of a comprehensive measurement scale to assess acculturation or information on other factors related to acculturation, such as length of time in the U.S. and languages spoken at home. Therefore we could not fully explore how those factors may have helped explain the increased state anxiety among Latinas preferring a Spanish interview.

Our study also lacked a measure of chronic stressors (also known as cumulative stress burden or cumulative adversity), characterized as events, strains and life-time traumas together.⁴⁰ Previous research has documented that these measures explained 25 to 40 percent of the variance in psychological distress and depressive symptoms.^{41, 42} Life-course proponents also postulate that these chronic stressors underlie racial disparities in birth and health outcomes.⁴³ Similarly, we did not fully account for the range of coping resources that might be available to mothers to buffer against anxiety. While low social support, as measured in our study (PRQ-2000), was a predictor of high state anxiety and also differed by race and language preference, it did not fully explain the relationships between race/ethnicity, language preference and high state anxiety. Our measure of social support also did not capture the extent to which mothers in our sample might have been socially isolated. Other unmeasured coping resources might include a sense of control or mastery over life and high self-esteem.⁴⁰

Implications

Early and effective interventions and screening for mental health and behavioral problems for mothers in the U.S. are still lacking.³⁷ Most early intervention programs in the neonatal intensive care unit do not address the psychological distress, including anxiety, that parents of premature infants experience.⁴⁴ Follow up on maternal distress and psychological well being is often not included in the care of the mother-infant dyad during hospitalization or after the infant's discharge to home. Our findings underscore the need for culturally appropriate interventions to reduce anxiety among Latina mothers following the delivery of a premature infant, especially among those with limited English language proficiency. Evidence suggests that a racially/ethnic diverse workforce, bilingual healthcare providers, and trained medical interpreters may help to ensure better outcomes.^{45, 46}

Future qualitative research is needed to better understand how language barriers, social isolation, social support, the NICU hospital setting, and other factors influence anxiety levels among Latina women delivering premature infants, especially among Spanish-speaking mothers. This information is essential for developing appropriately tailored interventions to reduce anxiety at a particularly vulnerable time for women.

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