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**Postpartum Depression Rates in Latine Birthing Parents During the COVID-19
Pandemic: A Closer Look at Cultural Protective Factors and Acculturation**

A Thesis Presented
By

Perla Barajas

To the W.M. Keck Science Department
Of Claremont McKenna, Pitzer, and Scripps Colleges
In partial fulfillment of
The degree of Bachelor of Arts

Senior Thesis in Human Biology
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Finally, this thesis is dedicated to my community in South Central Los Angeles. I promise to continue to advocate for you as I further my education and career, not only in the realm of public health but also regarding all social injustices that we continue to face.

Abstract

In the Latine community, the prioritization of social or familial support (familism) serves as a cultural protective factor that has typically guarded against unfavorable health outcomes. However, during the COVID-19 pandemic, social interactions and familial support were substantially limited. A vulnerable population during this pandemic was Latine birthing parents, because previous studies have shown that perception of social support directly impacts postpartum depression (PPD) in this group. This study will use data from the Pregnancy Risk Assessment Monitoring System to compare PPD rates for Latine birthing parents from before the COVID-19 pandemic to the PPD rates during the pandemic. Moreover, the level of acculturation (i.e., the degree to which one has assimilated to mainstream, US culture) could influence the way the Latine community was impacted because acculturation directly affects the strength of heritage culture values like familism. Accordingly, this project will examine the relationships between acculturation, perceived social support, and postpartum depression through surveys from Latine birthing parents across the US. Finally, to contextualize the results of the surveys, we will conduct qualitative interviews to record and analyze firsthand experiences of birthing parents during the pandemic. We predict that the PPD rates for the Latine population will be higher during the pandemic than before. We also predict that less acculturated birthing parents with low social support will experience more PPD symptoms than their more acculturated counterparts. Results from this study will be beneficial to understanding PPD and addressing it in a culturally and contextually appropriate manner for the Latine community.

Keywords: COVID-19 pandemic, postpartum depression, acculturation, social support, Latine

Project Description

Specific Aims

The COVID-19 global pandemic has been the main public health concern in the world since early 2020. Everyone was affected by this rapidly spreading disease and healthcare systems worldwide scrambled to adapt to changing guidelines and policies. The effects that were experienced by birthing parents throughout the COVID-19 pandemic uniquely showcased flaws in the healthcare system that directly impact birthing people and infant health. One important aspect of pregnancy health is the perinatal period in which many birthing people develop postpartum depression (PPD). People with PPD experience severe depression symptoms that affect their daily lives (CDC 2021), and ultimately, affect the infant's development and the family's dynamic (Logsdon et al. 2006 Johansson et al. 2020). As the pandemic continues into late 2021, and likely beyond (Murray and Piot 2021), it is important to have current information about postpartum depression rates considering how much the pandemic affected obstetrics and daily life in the past two years (Davis-Floyd et al. 2020). Currently, we have limited data on the changes seen in PPD rates within the United States, especially in regard to ethnic or racial minorities.

The Latine population's disproportionate COVID-19 rates and cultural values of *familismo*, (i.e., when higher emphasis is placed on the family unit rather than the individual), might suggest an increased risk for incidence of PPD during the pandemic due to strict quarantine guidelines. Given that social support is a documented cultural, protective factor in the Latine community (Finch and Vega 2003 Campos et al. 2014), it

is important to understand the effects that this community experienced at a time when it was dramatically limited. While we understand how these different cultural and social factors can affect postpartum depression, we do not know if, or how, the COVID-19 pandemic, along with the public health guidelines, affected Latine birthing parents. Moreover, through the process of acculturation (i.e., the process of assimilating to the dominant, host culture) these protective Latine cultural factors can decrease, thus placing more acculturated birthing parents at an increased susceptibility to PPD. Given that previous studies have shown detrimental effects on mental health when there is minimal social support (Martinez-Schallmoser et al. 2003 Rivera 2007), it is important to investigate how parents were affected and what social or cultural factors affected their postnatal health during the COVID-19 pandemic. This project will use a mixed methods approach to investigate the following aims:

Aim 1: Compare the postpartum depression rates from before and during the COVID-19 pandemic in the Latine birthing population. We will evaluate whether there were any differences in postpartum depression rates in Latine birthing parents who gave birth before and during the pandemic in the United States. This comparison will allow us to determine that there was a change that occurred during the pandemic, further justifying the need for research in this area.

Aim 2: Determine whether acculturation level predicted occurrence and/or severity of postpartum depression in postnatal Latine birthing parents throughout the COVID-19 pandemic in the United States. Through surveys, we will collect Latine birthing parents' age, gender, cis/trans status, education, geographic location, country of origin, income, and health insurance status, parity, gravidity, as well as level of

acculturation, perceived social support, and postpartum depression symptoms. This data will allow us to investigate how different social factors could influence PPD rates in this population. Postpartum depression will be measured with the Edinburgh Postnatal Depression Scale to measure the PPD symptoms that were being experienced.

Acculturation and Social Support will be measured with their respective surveys as well.

Aim 3: Collect and examine birthing and postpartum qualitative interviews from Latine birthing parents throughout the COVID-19 pandemic to inform future infrastructure planning in obstetrics. After collecting survey data, we will conduct semi-structured interviews with participants to learn more about their lived experiences. This will help us identify themes that were common in the shared experiences of the parents. This qualitative data will also be valuable information to provide context as health systems review quantitative data reflecting trends expressed in these testimonies.

Hypotheses:

Hypothesis 1

Due to limited access to family support, postpartum depression rates in Latine birthing parents during the COVID-19 pandemic will be higher than the PPD rates prior to the start of the pandemic.

Hypothesis 2

During the COVID-19 pandemic, birthing parents with a low acculturation score will have higher rates of postpartum depression than the high acculturation group, due to their higher cultural value of familism, but its limitation during the pandemic.

Hypothesis 3

During COVID-19 pandemic, birthing parents with a low acculturation score and low social support will have the highest rates of postpartum depression, due to their higher cultural value of familism, but its absence or dramatic limitation during the pandemic.

Significance

Background

The COVID-19 outbreak emerged in the fall of 2019 in the city of Wuhan, China. For months, news of this novel virus (SARS-CoV-2) spread throughout the world, yet, many systems were not prepared for the public health, economic, and social hardships that the coronavirus would create and intensify. On March 11, 2020, the World Health Organization (WHO) officially classified the outbreak as a pandemic and within days, governments implemented a “stay at home” order as a public health measure to contain the spread of the virus (WHO Director-General 2020). This pandemic magnified structural, social inequities, particularly harming racial and ethnic minorities, such as in the Black and Latine communities. For instance, even before the pandemic, there had been evidence for a higher incidence of heart disease, diabetes, and psychiatric disorders as poverty increases; through institutional discrimination in our society, minority groups are placed in disadvantaged positions and are left vulnerable to these social conditions of poverty, thus placing them at a greater risk to develop health problems (Burton et al. 2020). The social determinants of health that existed prior to this pandemic only worsened during this time (Burton et al. 2020, Gomez-Aguinaga et al. 2021, Campo-Arias and De Mendieta 2021).

The Latine community was disproportionately affected by this pandemic as shown through their 28% rate of COVID-19 prevalence despite making up only 18% of the population (Macias Gil et al. 2020). According to data from the Center for Disease Control (CDC), the Latine population in the United States had 1.9 times more COVID-19

cases than the non-Hispanic white population (CDC 2020). Researchers Garcia et al. used death certificate data from California to analyze demographics among COVID-19 deaths and found that Hispanics had the highest mortality rate ratio (Garcia et al. 2021). Recent studies have shown that various social determinants of health such as coexisting medical conditions, access to healthcare, immigration status, language barriers, and financial burden have an impact on the COVID-19 rates. Fortuna et al. identified additional pre-existing inequities at the root of the disproportionate impact that COVID-19 had on communities of color: healthcare disparities (access to COVID tests or vaccines), low wage employment that doesn't allow working from home, disparities in access to the internet at home, unaffordable childcare, the prison industrial complex, and overcrowded urban populations of color (Fortuna et al. 2020).

The year 2020 was the first time in many years (data from 2011-2020) in which the age-adjusted mortality rate among the Latine population was higher than that of the non-Latine White population (Simon et al. 2021). Different possible explanations could be the cause of this, but it is evident that social factors play a role in the health outcomes of the Latine community. Garcia et al. found higher proportional mortality rates in foreign-born Hispanic populations than in the U.S.-born non-Hispanic group (Garcia et al. 2021). This particularly interesting finding contradicts the Latine Health Paradox, an epidemiological phenomenon in which Latines in the United States demonstrate comparable, or better, health outcomes than their white counterparts despite having lower socioeconomic status and less access to quality healthcare.

The Latine Health Paradox has been explained by many researchers as being caused by socio-cultural protective factors (Hayes-Bautista 2002). These protective

factors include, and are not limited to, social support, familism, and religion (Acevedo-Garcia and Bates 2008). Oftentimes this hypothesis is presented with an acculturation hypothesis, meaning that as Latine immigrants spend more time in the United States, the more these protective factors deteriorate and thus lead to less favorable health outcomes. The acculturation process is also present across generations meaning that as generations continue to live in the United States, socio-cultural protective factors will continue to weaken. According to this hypothesis, social support and familism values are stronger in foreign-born Latine populations than in first- or second-generation populations. Moreover, a study by Marroquín et al. found that quarantine orders and social distancing affected family dynamics and individuals' mental health (Marroquín et al. 2020). Thus, we expect first generation, less acculturated, Latines to be more negatively impacted by restricted social interactions due to the drastic decline in familial support and their stronger familism values.

A particularly vulnerable population during the COVID-19 pandemic is Latine birthing parents because perceived lower social support during pregnancy has been shown to increase PPD rates in this particular ethnic population (Pao et al. 2019). Postpartum depression is a serious psychiatric illness that needs to be understood and taken as a serious threat to perinatal health. It generally occurs around 4-6 weeks postpartum and has symptoms like those of major depressive disorder. Symptoms include a persistent sad, anxious, or "empty" mood; feelings of guilt, worthlessness, hopelessness, or helplessness; trouble bonding or forming an emotional attachment with the new baby; and thoughts about death, suicide, or harming oneself or the baby ("Perinatal Depression" n.d.). Studies have found that the rate of onset depression is 2-3

times higher for individuals that are in the postpartum period than those who are not, making the perinatal period a very clear vulnerability (Payne and Maguire 2019).

Given what we know about acculturation and the Latine Health Paradox, evidence might suggest that postpartum depression rates are lower in immigrant and less acculturated Latines due to their reliance on social support and other cultural values. A PPD study in Latine perinatal birthing people revealed that higher acculturative status was linked to moderate and severe depressive symptoms (Davila et al. 2009). However, 2009 faced a much different reality than the current one. During the COVID-19 pandemic social interactions and familial interactions were drastically limited. Thus, the people with the strongest familism values (i.e., lower level of acculturation) were deprived of their support systems. This would lead us to believe that their mental health outcomes would worsen during the pandemic, particularly if they received low social support throughout.

During the COVID-19 pandemic, hospital regulations became stringent to prevent cross contamination and the spread of the virus. Obstetrics wards were especially careful due to the vulnerability of newborns and birthing parents. In many hospitals across the country, support people were being excluded from the delivery room completely, or birthing parents were made to choose one support person, which could mean choosing between their partner or their birthing coaches/doulas (Davis-Floyd et al. 2020). These policies, although precautionary, presented many birthing parents with stressful moments, especially to unaccompanied ones. Similarly, after returning home, the parent is faced with even more isolation due to physical distancing guidelines, consequently impacting their mental health. Previous studies found that social support can serve as a buffer

against the negative impacts of prenatal stress, further emphasizing the importance of gathering data about PPD rates during the pandemic (Coburn et al. 2016).

Innovation

Very little research exists about the impact that the COVID-19 pandemic has had on birthing parents and even less research about Latine birthing parents in the United States during this unprecedented time. Previous research indicates that postpartum depression rates increased during the pandemic in many different populations, including Latine birthing people (Lebel et al. 2020, Oskovi-Kaplan et al. 2021, Suarez-Balcazar et al. 2021). A study (Suárez-Rico et al. 2021) conducted in Mexico found that symptoms of depression, anxiety, and perceived stress were higher in postpartum women during the pandemic than before. From a sample of 293 women, the overall presence of depressive symptoms was 39.2% compared to the global average prevalence of 14-20% prior to the pandemic (Suárez-Rico et al. 2021). Although this research was performed in Mexico, the women who participated in the study were Latine, much like the sample we will use in our study. Many of the cultural protective factors might still be present in the immigrant and less acculturated Latine birthing parents. However, the public health and social life circumstances in Mexico were not the same as they were in the United States and the social determinants of health could be different resulting in different PPD rates and experiences. Regardless, existing research establishes the adverse and disproportionate effects of the COVID-19 pandemic on mental health and postpartum depression rates of Latine birthing parents.

The proposed study argues that we need to look even closer and examine the differences in health outcomes and experiences between foreign-born, less acculturated Latine birthing parents and U.S.-born, more acculturated Latine birthing parents. To my knowledge, there are no studies that examine postpartum depression rate differences between these two groups during the pandemic. The results of this project will allow us to identify whether less acculturated birthing people were at a greater risk for postpartum depression during the pandemic and give us insight on what the birthing parents themselves think put them at a greater risk for PPD.

This project will utilize a mixed-methods approach to effectively understand how the COVID-19 pandemic affected the post-partum depression rates in immigrant and acculturated Latine birthing parents. While quantitative data is helpful to understand the PPD rates and trends with regards to other survey responses, qualitative data will be used to provide a narrative to these trends. Additionally, this study will highlight the voices of a community whose feelings and experiences are often invalidated in scientific literature and in society. With this data, healthcare providers and systems can understand the cultural factors that put certain populations at risk and note them when reorganizing health systems in the future. The results from this research project will be valuable for all parties who rely on perinatal mental health research to advocate for the rights of disadvantaged birthing parent populations. The first-hand experiences and accounts from birthing parents across the United States will also serve as guidance for any parents who find themselves experiencing PPD.

Existing research looks at anxiety and depression rates among pregnant individuals but there none that center the experiences of Latine birthing parents. Since the

COVID-19 pandemic is such a recent and ongoing phenomenon, there is not much research that has analyzed cultural values and experiences during the pandemic, so acculturative impacts have yet to be investigated. This research will shed light on the experiences of Latine birthing parents to understand the impacts of cultural values in this context. Additionally, through a mixed-methods approach, this study will uniquely record and analyze both quantitative and qualitative data about being a Latine birthing parent during the pandemic.

Approach

3A. Methodological Approach

To investigate the differences in postpartum depression rates between time periods (specific aim 1), we will utilize data from the Pregnancy Risk Assessment Monitoring System (PRAMS). This system collects population-based data through surveys on birthing parent behaviors and experiences before, during and after pregnancy from 46 out of the 50 US states (Bauman et al. 2020). For the purposes of this research project, we will focus on responses to **two** questions from the Phase 8 PRAMS questionnaire (“CDC -PRAMS Questionnaires -Pregnancy Risk Assessment Monitoring System -Reproductive Health” 2021):

1) “Since your new baby was born, how often have you felt down, depressed, or hopeless?”

2) “Since your new baby was born, how often have you had little interest or little pleasure in doing things you usually enjoyed?”

Birthing parents who respond “always” or “often” to either of these questions will be classified as experiencing PPD symptoms. These standards were adopted from existing research that investigated postpartum depressive symptoms and medical provider discussions about PPD conducted by the CDC (Bauman et al. 2020). Although the PRAMS questionnaire includes a question about diagnoses, the use of the aforementioned questions allows us to account for the undiagnosed population that still experienced symptoms. To see if PPD rates in Latine birthing parents differ before vs. during the COVID-19 pandemic, we will measure how many birthing parents experienced PPD symptoms at each of the 50 participating PRAMS sites across two time periods. We will then perform a paired t-test to analyze the change in PPD rates at each site.

Our second aim analyzes the relationship between levels of acculturation and postpartum depression in Latine birthing parents during the pandemic. This quantitative analysis will allow us to measure the effects that social support and acculturation have on birthing parents during the pandemic. For this section, we will employ three different surveys previously tested for reliability within the Latine community: The Vancouver Index of Acculturation, the Medical Outcomes Study social support survey, and the Edinburgh Postnatal Depression Scale (EPDS). Researchers Davila et al. (2009) used the Center for Epidemiologic Studies-Depression scale to measure PPD, but the survey questions revealed too many overlapping symptoms of pregnancy and depression, such as fatigue and sleep or appetite changes. To avoid this overlap, we will employ the EPDS because it excludes constitutional symptoms of depression. We will also measure social support because previous research has established it as having a mediating role in explaining mental health differences across acculturation profiles (Bulut and Gayman

2020). Having context about the mediating effect social support has on a birthing parent allows us to further understand the dynamic between acculturation and PPD.

For our third aim we will collect qualitative data about the birthing parents' experiences through semi-structured interviews. A qualitative approach is included in this project because, in addition to understanding the statistical data, understanding lived experiences is vital to creating a holistic healing approach for the affected communities. The qualitative analysis will focus on identifying prominent themes such as loneliness, sadness, or stress.

My methodological approach is advantageous because it gathers quantitative data to analyze patterns or trends but also contextualizes it with qualitative narratives. To my knowledge, there are no other studies using a mixed-methods approach to understand postpartum depression and levels of acculturation in Latine birthing parents. Not only does qualitative data add context to the quantitative data we'll collect, but it provides an opportunity to amplify and collect the sentiments and experiences lived by people who are marginalized by society. This sets these methods and results apart from any existing literature.

3B. Materials and Methodology

Specific Aim 1:

This study will use data from the Pregnancy Risk Assessment Monitoring System (PRAMS) created from a joint research project between the CDC's Division of Reproductive Health and state, local, or territorial health departments ("About PRAMS |

CDC” 2021). This survey is an ongoing, site-specific, population-based surveillance system that collects data about pregnancy and the perinatal stage. They use birth certificates to obtain an annual stratified sample of about 1,000 to 3,000 women who recently gave birth in the participating states. Birthing parents are recruited and contacted a maximum of six times in order to get a survey response. Our focus for this analysis is the answer to the two questions about depressive symptoms.

We will use survey responses from people who gave birth from March 2019-March 2020 (pre-pandemic) and April 2020-April 2021 (pandemic). According to the CDC, each participating site samples between 1,300 and 3,400 women per year and there are 50 sites (“PRAMS Methodology | CDC” 2021). We will screen responses for Latine/Hispanic birthing parents. Given that Latine birthing parents make up around 18% of the total population of birthing parents, we expect to have a sample of 234-612 birthing parents at each site for each of the two time periods.

Analytic Approach

Hypothesis 1 (H1). Due to limited access to family support, postpartum depression rates in Latine birthing parents during the COVID-19 pandemic will be higher than the PPD rates prior to the start of the pandemic.

Postpartum Depression Symptoms (Binary: 1/0). Postpartum depression incidence will be measured by the answer to two questions from the PRAMS survey:

- 1) “Since your new baby was born, how often have you felt down, depressed, or hopeless?”
- 2) “Since your new baby was born, how often have you had little interest or little pleasure in doing things you usually enjoyed?”

Birthing parents who respond “always” or “often” to either of these questions will be considered to be experiencing PPD (1) and other responses as not experiencing PPD (0).

Time. For this initial part of our project, the independent variable is the time period. PRAMS data will be separated into two time categories: pre-pandemic and pandemic.

For each of the 50 PRAMS sites, we will measure the proportion of birthing people who experienced PPD symptoms. We will then analyze the data with a paired t-test to compare the changes in PPD rates over time.

Specific Aims 2 and 3:

Sample

Eligible birthing parents for our study will be Latine birthing parents between the ages of 18-40 years old. Participants will be recruited from anywhere in the United States through bilingual advertisements online and in physical locations. We will inform pediatrician offices, WICs, daycare centers, and obstetrician offices about our study and ask that they inform any eligible parents to participate. After participating in the survey portion of the study, participants will be asked if they’d like to participate in a semi-structured interview about their experiences as a birthing parent during COVID-19. To encourage participation and value the participants’ time, each participant will be offered a \$25 Visa gift card for their time as well as a “self-care” kit if they participate in the interview portion. A previous study that used similar recruitment methods in Canada, gathered 2225 participants in a time span of 15 days (Lebel et al. 2020). By running this study for 8 weeks, we expect to gather around 8000 responses from Latine birthing

parents. Routine demographic information and potential confounding variables will be obtained for all participants including age, gender, cis/trans status, marital status, education, geographic location, country of origin, income, and health insurance status, parity, and gravidity. Surveys will be available in English and Spanish.

Measures

Acculturation *Vancouver Index of Acculturation (VIA)*. The VIA (Appendix A) is a bidimensional assessment that assesses both the acquisition of host cultural norms and loss of heritage cultural norms through 20 items in accordance with the more recent theory of acculturation (Ryder et al. 2000). It is rated on a 1 (*strongly disagree*) to 9 (*strongly agree*) Likert scale where 10 items are about the host (American U.S. culture) and 10 items about their own heritage (Latin American culture; Testa et al. 2019).

Participants are first asked to identify their heritage. Then, participants rate items such as “I often behave in ways that are typical of my heritage culture,” and “I often behave in ways that are typically American.” The original VIA scale uses “North American” as the host culture, but we will be changing it to “U.S.” in the present study as the U.S. is the host culture for all participants. Participants will be considered to have a low acculturative status if their heritage score is higher than 5 and their mainstream score is lower than 5. If they have a heritage score lower than 5 and a mainstream score higher than 5, they will be considered to have a high acculturative status. People with high (>5) heritage and mainstream scores will be considered bicultural. The VIA heritage scale had Cronbach’s alpha of .88 for the heritage subscale and .90 for the mainstream scale, thus demonstrating good reliability (Santos and Kalibatseva 2019).

Social Support *Medical Outcomes Study (MOS) social support survey*. The MOS social support survey (Appendix B) is used to assess various dimensions of social support including emotional, tangible, affectionate, and positive social interaction (Pao et al. 2019). Participants are asked “How often is each of the following kinds of support available to you if you need it?” and the statements are rated on a Likert scale of 1 (*none of the time*) to 5 (*all of the time*) (Sherbourne and Stewart 1991). The mean of all the responses is taken. Higher scores indicate greater social support; for this study, mean scores of 4-5 will be considered to have high perceived social support and scores 1-3 will be considered to have low perceived social support. They are asked if they had access to “someone to help you if you were confined to bed” or “someone who hugs you.” When filling out this survey, participants will be asked to think retroactively to the months following their birth during the pandemic. The MOS social support survey has shown a high Cronbach’s alpha coefficient (.83 –.97) in a diverse sample and across groups, thus demonstrating good reliability (Pao et al. 2019).

PPD *Edinburgh Postnatal Depression Scale (EPDS)*. The EPDS (Appendix C) is a screening survey made up of 10 questions regarding mood and emotions after having a child. This survey is used frequently in research settings to screen for perinatal depression because it is available in 50 languages and only takes about 5 minutes to complete (“Screening for Perinatal Depression” n.d.). Participants are asked questions such as, “I have looked forward with enjoyment to things” and “I have felt sad or miserable” (Cox et al. 1987). Each question has 4 possible answers and are scored slightly differently depending on the question. The cutoff scores for PPD were established by Liu et al. in 2016: none or minimal depression (0–6), mild depression (7–13), moderate depression

(14–19), and severe depression (19–30) (Liu et al. 2016). When filling out this survey, participants will be asked to think retroactively to the months following their birth during the pandemic.

Interview Participants who elect to participate in the interview portion of this study will be assigned to a member from the research team. They will conduct a semi-structured, 45–90-minute interview. Birthing parents will be asked to talk about their experiences at the facility where they gave birth, including interactions with health providers and overall satisfaction with the experience. They will also talk about their experiences after birth until 6 weeks postpartum. They will be asked, “Can you tell me about your birthing experience?” and “What was your mood like once you returned home?” The interview schedule will not need to be strictly followed, instead interviewers should adapt the questions to the parents’ narratives and facilitate the process of reflecting and probing, for example, by responding: ‘You said that... tell me more about that.’ Interviews will be conducted in the language the participant is most comfortable with.

Analytical Approach

Hypothesis 2 (H2). During the COVID-19 pandemic, birthing parents with a low acculturation score will have higher rates of postpartum depression than the high acculturation group, due to their higher cultural value of familism, but its limitation during the pandemic.

To test H2 we will run a linear regression model to analyze the relationship between acculturative status and EPDS scores. For the first analysis, our independent variable is acculturative status which will be categorized into “low acculturation,” “bicultural,” and “high acculturation” as outlined in our measures. The dependent

variable is the score to the EPDS (0-30). The linear model will allow us to see the impact of acculturation level on PPD symptoms during the pandemic.

We will also conduct linear models for the individual VIA scores. One will analyze the heritage culture score's potential influence on the EPDS scores while the other will analyze the mainstream culture score's potential influence. For these analyses we will exclude bicultural (>5 score on both) birthing people to control for confounding data. Statistical analyses will be conducted using R statistical computing software.

Hypothesis 3 (H3). During COVID-19 pandemic, birthing parents with a low acculturation score and low social support will have the highest rates of postpartum depression, due to their higher cultural value of familism, but its absence or dramatic limitation during the pandemic.

In order to test H3, we will run a multiple regression model that measures the predictors of acculturation level and perceived social support and its potential influence on the EPDS scores. Acculturation status will either be "low," "bicultural," or "high" and perceived social support will either be "low" or "high." The multiple regression model will allow us to make predictions about the roles of social support and acculturation on postpartum depression symptoms. Statistical analyses will be conducted using R statistical computing software.

3C. Expected Results

H1: We predict that the paired t-test will indicate higher rates of postpartum depression at each of the participating PRAMS sites during the COVID-19 pandemic than prior to it (figure 1).

H2: We predict that people with low levels of acculturation will have higher EPDS scores during the pandemic (figure 2). We also expect that people with higher heritage culture scores on the VIA will have higher EPDS scores than those with higher mainstream culture scores on the VIA (figure 3).

H3: We predict that people with low levels of acculturation and low levels of social support will have the highest scores on the EPDS signifying more symptoms of PPD (figure 4). However, people with low levels of acculturation and high perceived social support might have low levels of PPD because they received the familial support they value. On the other hand, birthing people with higher levels of acculturation may not have as high levels of PPD symptoms.

Figure 1

Postpartum Depression Rates Pre-Pandemic vs. During the Pandemic

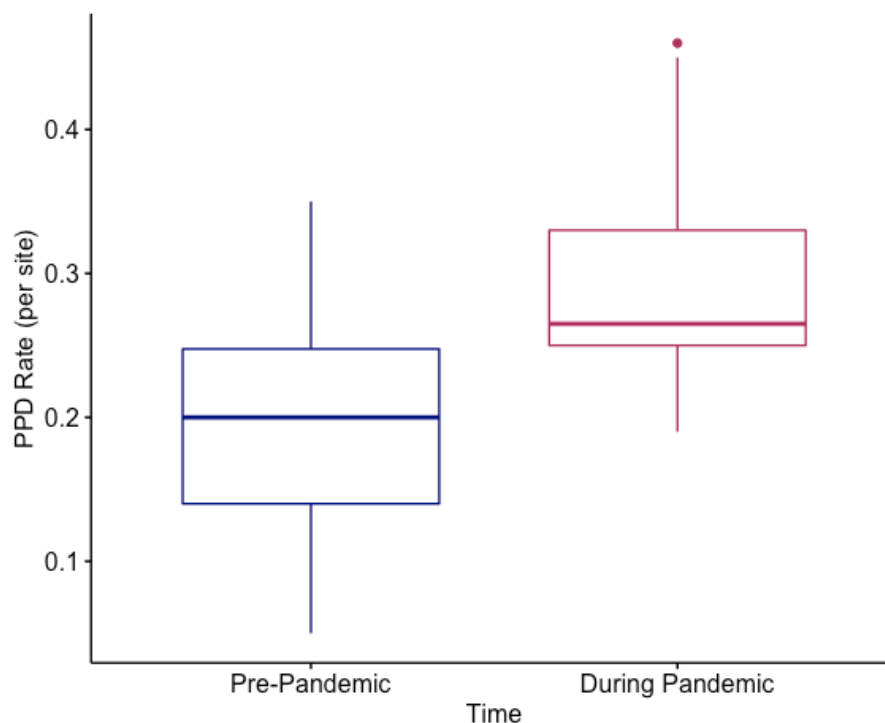
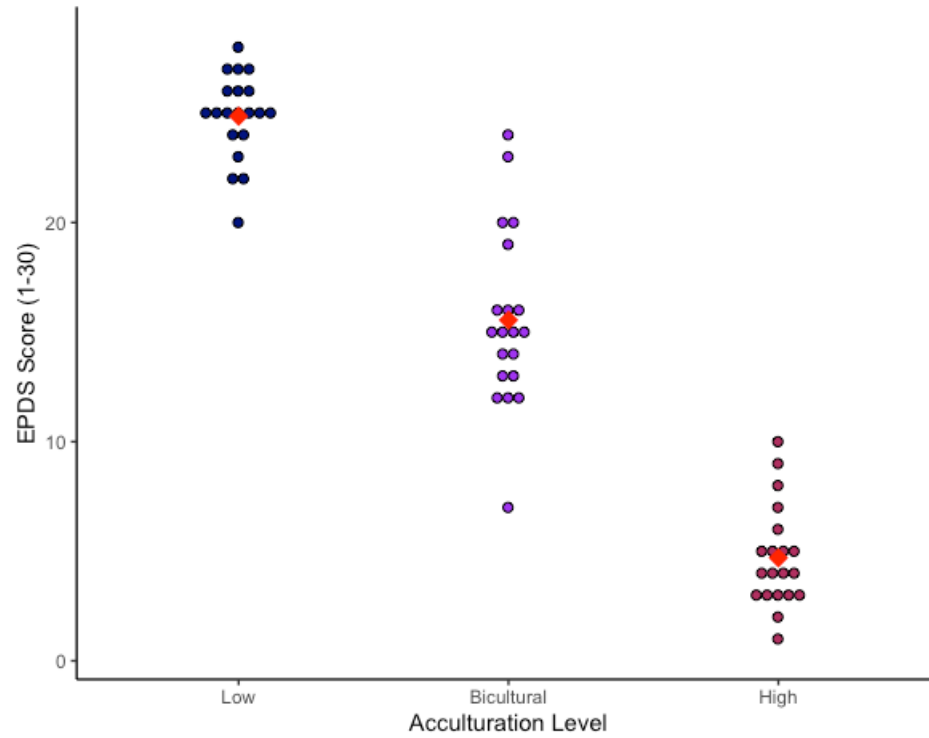


Figure 2

Relationship Between Acculturation and Postpartum Depression Symptoms

**Figure 3**

Relationship Between VIA Scores and Postpartum Depression Symptoms

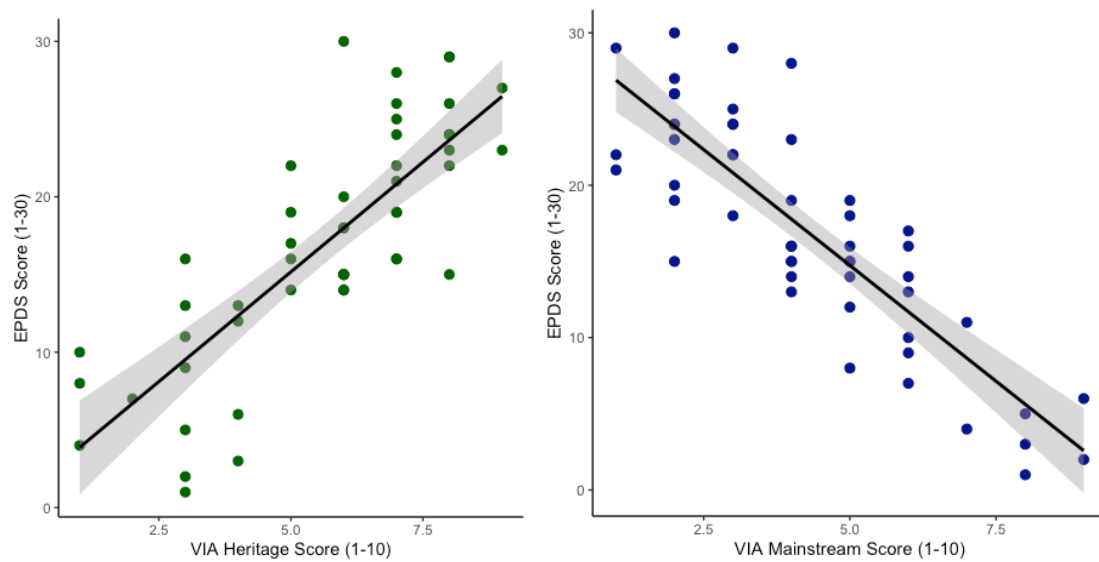
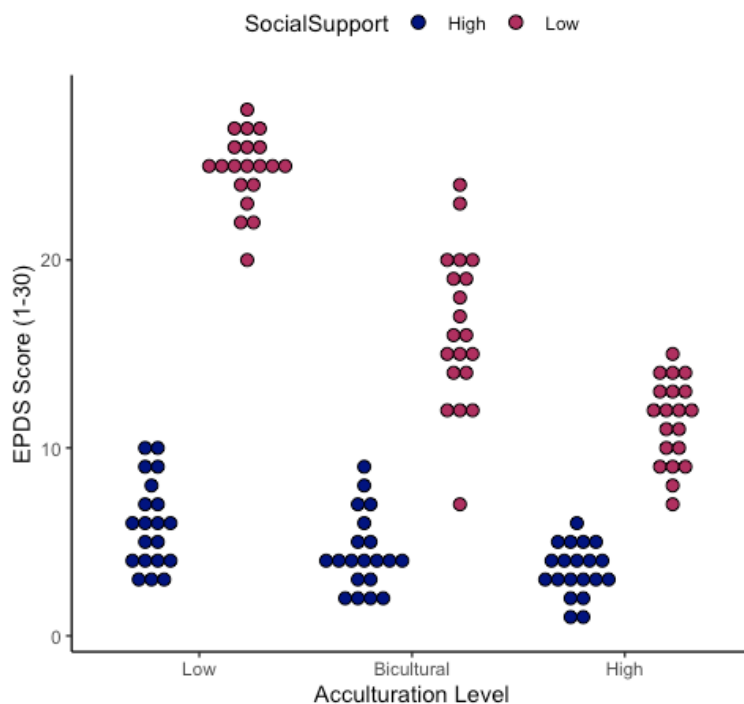


Figure 4

Effects of Perceived Social Support and Acculturative Status on Postpartum Depression Symptoms



3D. Limitations

One of the limitations of this study is that analyses on possible covariates are not a part of the initial methodology. However, because this study will be collecting the data, there is an opportunity for future research in this area.

Additionally, there is a possibility that there could be some recall bias associated with responses to the surveys and interviews. This could be the case because we are asking the birthing parents to recall experiences from as far back as April 2020. Because this could have been a potentially difficult time for them, there is a possibility that they may recall events differently or omit details. For this reason, it may be challenging to

replicate this study in the future because public safety guidelines regarding quarantine and social isolation have been relaxed and more people are able to receive the social support they need now. However, this does not diminish the need for extensive research on cultural factors that affect postnatal health in the Latine population.

3E. Impact and Future Directions

The purpose of this study is to understand how Latine cultural values and acculturation affected postpartum depression rates during the COVID-19 pandemic. Although we will only be collecting data from the Latine population, methods from this study could potentially be replicated with other populations that also heavily value social/familial support, such as populations from other collectivist cultures. This could provide some unique insight on cultural values and postpartum depression in other populations.

This study will collect testimonies of birthing parents whose voices have not been historically amplified, thus providing much needed research, and understanding for a population that continues to grow in the US (Noe-Bustamante et al. n.d.).

The findings from this study will provide public health stakeholders with culturally and contextually appropriate data about postpartum depression in the Latine community. Moreover, the findings from the qualitative interviews could be used to strategize and develop appropriate systems to support vulnerable birthing people when social support is limited or unavailable.

Appendix

Appendix A: Vancouver Index of Acculturation (VIA)

Please select one of the numbers to indicate your degree of agreement or disagreement. Many of these questions will refer to your heritage culture, meaning the original culture of your family (other than U.S. American). It may be the culture of your birth, the culture in which you have been raised, or any culture in your family background. If there are several, pick the one that has influenced you most (e.g., Cuban, Mexican, Salvadoran). If you do not feel that you have been influenced by any other culture, please name a culture that influenced previous generations of your family.

Your heritage culture (other than U.S. American) is: _____

1. I often participate in my heritage cultural traditions.
2. I often participate in mainstream American cultural traditions
3. I would be willing to marry a person from my heritage culture.
4. I would be willing to marry a white American person.
5. I enjoy social activities with people from the same heritage culture as myself.
6. I enjoy social activities with typical American people.
7. I am comfortable interacting with people of the same heritage culture as myself.
8. I am comfortable interacting with typical American people.
9. I enjoy entertainment (e.g.movies, music) from my heritage culture.
10. I enjoy American entertainment (e.g.movies, music).
11. I often behave in ways that are typical of my heritage culture.
12. I often behave in ways that are typically American.
13. It is important for me to maintain or develop the practices of my heritage culture.
14. It is important for me to maintain or develop American cultural practices.
15. I believe in the values of my heritage culture.
16. I believe in mainstream American values.
17. I enjoy the jokes and humor of my heritage culture.
18. I enjoy white American jokes and humor.
19. I am interested in having friends from my heritage culture.
20. I am interested in having white American friends.

Appendix B: Medical Outcomes Study Social Support Survey

People sometimes look to others for companionship, assistance, or other types of support.

How often is each of the following kinds of support available to you if you need it?

Choose one number from each line.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
1. Someone to help you if you were confined to bed	1	2	3	4	5
2. Someone you can count on to listen to you when you need to talk	1	2	3	4	5
3. Someone to give you good advice about a crisis	1	2	3	4	5
4. Someone to take you to the doctor if you needed it	1	2	3	4	5
5. Someone who shows you love and affection	1	2	3	4	5
6. Someone to have a good time with	1	2	3	4	5
7. Someone to give you information to help you understand a situation	1	2	3	4	5
8. Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
9. Someone who hugs you	1	2	3	4	5
10. Someone to get together with for relaxation	1	2	3	4	5
11. Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5

12. Someone whose advice you really want	1	2	3	4	5
13. Someone to do things with to help you get your mind off things	1	2	3	4	5
14. Someone to help with daily chores if you were sick	1	2	3	4	5
15. Someone to share your most private worries and fears with	1	2	3	4	5
16. Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
17. Someone to do something enjoyable with	1	2	3	4	5
18. Someone who understands your problems	1	2	3	4	5
19. Someone to love and make you feel wanted	1	2	3	4	5

Appendix C: Edinburgh Postnatal Depression Scale**Edinburgh Postnatal Depression Scale¹ (EPDS)**

Name: _____ Address: _____

Your Date of Birth: _____

Baby's Date of Birth: _____ Phone: _____

As you are pregnant or have recently had a baby, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt **IN THE PAST 7 DAYS**, not just how you feel today.

Here is an example, already completed.

I have felt happy:

- Yes, all the time
- Yes, most of the time This would mean: "I have felt happy most of the time" during the past week.
- No, not very often Please complete the other questions in the same way.
- No, not at all

In the past 7 days:

1. I have been able to laugh and see the funny side of things
- As much as I always could
 - Not quite so much now
 - Definitely not so much now
 - Not at all
2. I have looked forward with enjoyment to things
- As much as I ever did
 - Rather less than I used to
 - Definitely less than I used to
 - Hardly at all
- *3. I have blamed myself unnecessarily when things went wrong
- Yes, most of the time
 - Yes, some of the time
 - Not very often
 - No, never
4. I have been anxious or worried for no good reason
- No, not at all
 - Hardly ever
 - Yes, sometimes
 - Yes, very often
- *5. I have felt scared or panicky for no very good reason
- Yes, quite a lot
 - Yes, sometimes
 - No, not much
 - No, not at all
- *6. Things have been getting on top of me
- Yes, most of the time I haven't been able to cope at all
 - Yes, sometimes I haven't been coping as well as usual
 - No, most of the time I have coped quite well
 - No, I have been coping as well as ever
- *7. I have been so unhappy that I have had difficulty sleeping
- Yes, most of the time
 - Yes, sometimes
 - Not very often
 - No, not at all
- *8. I have felt sad or miserable
- Yes, most of the time
 - Yes, quite often
 - Not very often
 - No, not at all
- *9. I have been so unhappy that I have been crying
- Yes, most of the time
 - Yes, quite often
 - Only occasionally
 - No, never
- *10. The thought of harming myself has occurred to me
- Yes, quite often
 - Sometimes
 - Hardly ever
 - Never

Administered/Reviewed by _____ Date _____

¹Source: Cox, J.L., Holden, J.M., and Sagovsky, R. 1987. Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 150:782-786 .

²Source: K. L. Wisner, B. L. Parry, C. M. Piontek, Postpartum Depression N Engl J Med vol. 347, No 3, July 18, 2002, 194-199

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