Heart Rate Variability as a Screening Tool for Perinatal Depression Risk in College-Educated, Middle-Class, Hispanic Women of Childbearing Age in Urban South Florida

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Abstract

Perinatal depression (PND) affects about one in seven women in the United States, with potentially devastating consequences for mothers and their families. A pillar of change delineated in the Mind the Gap report was the need for better screening methods to prevent suffering with perinatal depression. The perinatal mental health crisis has not been mitigated by using self-rated screening instruments, pointing to a need for physiological ways to screen which bypass cultural expectations. While Hispanic women are more likely to be at risk for PND, they are also less likely to be diagnosed and referred to treatment. Screening for the subpopulation of middle-class, college-educated, Hispanic women needs to occur early in pregnancy and include physiological measures, such as heart rate variability (HRV), to completement self-report measures in order to reduce cultural barriers and provide timely intervention. Additionally, Biblical integration and cultural sensitivity are foundational in providing holistic care. Recommendations for future research include standardization of HRV protocols, long-term HRV measures and psychoeducation. Expanding screening tools which measure physiological components linked to PND has the potential to make a difference in the lives of women who are struggling yet silently suffering.

Key words: perinatal depression, Hispanic women, heart rate variability

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The topic of perinatal depression is one filled with stigma and silence. A mother suffering during a time when most have expectations of bliss can be disheartening both for the mother and those around her. The contradictions between those expectations and uncontrollable feelings of distress themselves perpetuate further pain, usually related to shame (Kleinman, 2023).

There is a need for more education, acceptance, and overall openness regarding this disorder. One in twenty women die by suicide during the perinatal period (Margerison et al., 2022). It is evident that better screening methods are needed – especially within the subpopulation of middle-class, college-educated, Hispanic women – to prevent unfortunate and devastating consequences of suffering with perinatal depression in silence.

The topic of perinatal depression will be addressed first, followed by an analysis of the important variables associated with this disorder. Once explained, an interpretation, in light of Scripture will be offered, as well as the possible future of research in this area. Lastly, a summary of what has been discussed will be provided in the conclusion.

Current Research

Overall, *perinatal depression* (PND) is a prevalent but stigmatized disorder. Women who experience this during a time when they are expected by society at large to be happy feel a strong sense of failure in motherhood (Kleiman, 2023). This leads to many women enduring the difficult time alone, afraid to speak up for fear of judgment, leading to a lack of knowledge regarding the prevalence of this disorder. However, it is prevalent, and additionally, it does not discriminate for race or ethnicity, socioeconomic status, or education – affecting women of all walks of life (Reilly et al., 2023). Over the years 2016-2023, all demographics of mothers

experienced a drop in mental health, leading many to consider the situation a public health crisis (Storey, 2025). This crisis has not been mitigated by using self-rated screening instruments, pointing to a need for physiological ways to screen which bypass cultural expectations.

Maternal Health in the Perinatal Period

Maternal mortality rates have increased steadily between 2018-2021 (Hoyert, 2023). Perinatal depression (PND) is a major public health concern, as women diagnosed with PND are found to be more likely to commit suicide (Postpartum Support International [PSI], 2025; Shinba et al., 2024). Mind the Gap, a report from PSI highlighting necessary measures that need to be taken to help moms, stated that mental health conditions are the second leading cause of death up to one year postpartum in the United States (Reilly et al., 2023).

Mind the Gap also stated that African American and Hispanic women are among the highest in prevalence for PND (Reilly et al., 2023). Minority women who screened positive for depression on the *Edinburgh Postnatal Depression Scale* (EPDS), the most commonly used assessment for postpartum depression, in the perinatal period were found to be less likely to be referred to treatment than non-Hispanic white women (Boama-Nyarko et al., 2024). This illustrates one of the gaps in this field – minority women are being affected in high numbers but are not represented in treatment referrals. Barriers to treatment must be overcome to surpass this public health crisis. One way to address this could be by focusing on physiological measures that transcend culture, stigma, and ethnicity.

For almost thirty years, Florida has been collecting monthly data on a random sampling of about 200 women from the Birth Certificate Registry for the *Florida Pregnancy Risk Assessment Monitoring System* (PRAMS). Under this system, data is collected yearly from the Florida Department of Health (n.d.), with the latest data from the year 2022. It was found that the

overall percent of Women Who Experienced Depressive Symptoms After Giving Birth was 11.9%. Findings from 2022 also revealed that women were more likely to be between the ages of 20-24 years old, have earned at least a high school diploma, earn less than $16,000 a year, be unmarried, and receive Medicaid. Hispanic women encompassed 7.6% of the total number experiencing depressive symptoms postnatally.

Of relevance to this research, when determining how many received counseling for postpartum depression, the sample size was too low to determine prevalence for minority women. Overall, they found a little over half received counseling, yet the majority were white non-Hispanic (46.7%). There is no data on minorities receiving help for postpartum depression in the state of Florida.

Etiology of Perinatal Depression

Psychosocial factors, such as dissatisfaction with pregnancy or poor relationship with their partner, have been found to be indicative of developing postpartum depression (Oliveira et al., 2022). In addition, any prior depression or other emotional disorders such as anxiety may also be risk factors for postpartum depression. Goldman-Mellor et al., (2025) found increased suicide attempts in women who reported to the emergency room perinatally with prior behavioral health related issues and psychiatric disorders.

Emerging studies have also found correlations between low fiber intake and low microbial diversity in the gut with increased depression and stress, respectively (Ebrahimi et al., 2024; Long et al., 2023). Perhaps, it could also be caused by a disruption in neurotransmitters (Scrandis, 2024). For example, gamma-aminobutyric acid (GABA) has been getting attention due to links of dysfunctional receptors with depression and anxiety. Given the effect

neurotransmitters have on regulation of the autonomic nervous system, there seems to be a future in assessing the relationship between nervous system functioning and PND.

Defining Perinatal Depression

Describing PND as perinatal depression is in accordance with the National Institute of Mental Health (2023). PND has some operationally defined differences from postpartum depression (PPD) and prenatal depression, essentially capturing a wider range of time.

The National Institute of Mental Health describes PND as a mild to severe mood disorder that occurs during or after pregnancy, usually within a month or two after delivery. PND brings on feelings of extreme sadness, anxiety, and extreme fatigue. It has been found to be relieved with psychotherapy and/or medication. In addition, many women who experience PND have a history of depression. This definition acknowledges the increased occurrence of PND in the postpartum period without disregarding the findings that many women who experience PND have a prior history of mental health issues, as previously described.

Research Gap in Perinatal Depression

Research reveals a substantial need to develop new and better ways to screen Hispanic perinatal women to help prevent PND by establishing simple and efficacious screening methods that go beyond self-report. Novel methods are needed to increase screening and treatment for this vulnerable population (Reilly et al., 2023). Additionally, screening is among one of the five main priorities for bridging the gap in healthcare for women in the perinatal period according to the Mind the Gap report (Reilly et al., 2023).

Specific to the Hispanic population, while a two-to-five-fold increase has been found in PND risk, screenings are often done after birth, leading to decreased PPD diagnosis since Hispanic women are less likely to attend those appointments (Velasquez, 2023). Machine

learning models used to predict PPD using electronic medical records had moderate predictions, but demonstrated bias towards minority women (Huang et al., 2024). There is a great need for ways to predict PPD (Winstone-Weide et al., 2023), especially for underrepresented minorities in a format that reduces reporting biases.

Population of Interest

Hispanic women in the perinatal period are at a higher risk of PND often due to cultural beliefs (Velasquez, 2023). A study looked at Hispanic women, average of 28-years-old, mostly in relationships, and assessed for perinatal depression using the EPDS during the perinatal period (Rodas et al., 2025). It was found that perinatal depression decreased over time and women whose primary language was Spanish, had previous mental health issues, and had been victims of domestic violence had higher levels of depression than those who did not.

Also assessing for prenatal depression, Groer et al. (2024) found that Hispanic women's risk of depression as measured with the EPDS decreased as the pregnancy progressed, and among those with higher scores, it was more likely to have low income, low education, and be unmarried. Prenatally, Latin women, averaging 27-years-old, who scored low on self-rated health questions had higher depression symptoms (Juarez Padilla et al., 2022). Additionally, in a sample of low-income minority women, increased life stressors were associated with increased levels of PND symptoms (Julian et al., 2023).

Given Hispanic culture's emphasis on marianismo, middle-income, college-educated Hispanic women of childbearing age in South Florida may better hide symptoms of PND (Velasquez, 2023). Therefore, physiological measures may be more predictive of PND risk than self-rated assessments. Most studies previously shared focus on low-income minorities (Boama-Nyarko et al., 2024; Groer et al., 2024; Julian et al., 2023; Reilly et al., 2023). This study will

focus on screening for middle-income, college-graduate Hispanic women. Women who function at a high level while still enduring difficulties may possibly be masking symptoms of PND. Because the body keeps the score (van der Kolk, 2014), physiological measures such as *heart rate variability* (HRV) may be more predictive of PND risk in this population.

Variables Associated with Heart Rate Variability and Perinatal Depression

Diagnostic Criteria and Comorbidity

The *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5-TR) classifies PPD as a specifier, "with peripartum onset" for major depressive disorder (American Psychological Association [APA], 2022). Onset is either during pregnancy or within 4 months after delivery. The DSM-5 TR also states that about half of PPD episodes begin during pregnancy. However, mothers positive for PPD do not have the same amount of reduction in parasympathetic activity when compared to major depressive disorder (Shinba et al., 2024), pointing to a unique presentation of depression.

While hormonal changes are normal during pregnancy, thyroid disorders need to be ruled out as cause of depressive symptoms (APA, 2022). More than half of young, at least high-school educated, average socioeconomic status women who reported postpartum depressive symptoms also reported postpartum anxiety symptoms (Nakić Radoš, 2018). The same was true with the reverse correlation.

In an interesting study of postpartum women in Cuba – a population largely represented in South Florida – revealed a 5.8% comorbidity between postpartum anxiety and depression (Esquivel Lauzurique, 2022). Obsessive compulsive disorder has also been found to be comorbid with perinatal depression (Nakić Radoš, 2025).

Psychological and Physiological Screening

Perinatal depression risk is often assessed with the Edinburgh Postnatal Depression Scale (Groer et al., 2024; Rodas et al., 2025), a 10-item self-report screening tool. It has been found to be highly important to assess during the third trimester due to increased levels of stress (Kishan et al., 2023). However, stress and crises are not simply psychological constructs; rather, they have measurable physiological components that reveal links between the mind and the body (Levers, 2023; Sapolsky, 2004). A study in China found that women with perinatal depression had less connectivity between brain regions based on electroencephalogram data (Peng et al., 2024). Peng et al. (2024) stated a need for physiological markers over psychological screening instruments.

Heart Rate Variability

HRV is a way to measure autonomic health, with high HRV being linked to more adaptive responses to stress (Brandes-Aitken et al., 2024). HRV can be measured using multiple methods, including an electrocardiograph (ECG). However, methodology which includes measurement of *respiratory sinus arrythmia* (RSA) is essential for quantifying autonomic function (Porges, 2022). RSA is a component of HRV data that, according to *Polyvagal Theory* (PT), is an excellent measure of the activity of the ventral vagus (Porges, 2022). High RSA means more vagal tone, which in turn reflects a greater measure of emotional regulation (Dana, 2021; Porges, 2022). Therefore, HRV measurements can reveal an overactivated nervous system irrespective of cognitive regulation, leading to a greater likelihood of screening for high functioning women. The question is then, can HRV be a reliable way to screen for PND risk?

Preliminary studies report that it can be. HRV has been found to be correlated with PPD by utilizing smart phone technology to provide reliable information regarding PPD risk in an affordable and convenient way (Singh Solorzano et al., 2022). Studies have found that HRV

measures during the third trimester predict stress and depressive symptoms postnatally (Kishan et al., 2023), as well as associations between lower HRV and higher self-reported symptoms of depression and anxiety postnatally (Brandes-Aitken et al., 2024). Hispanic, middle-income women, who may be masking psychosocial PND symptoms, but experiencing them somatically, would have a way to be screened.

High HRV measures are linked to more adaptive stress responses (Brandes-Aitken et al., 2024) and more vagal tone (Dana, 2021; Porges, 2022). Therefore, assessment with HRV has the potential to reveal physiologically what may be a hidden psychological risk. A study by Sampson et al., (2024) found that an at-home, 5 visit protocol, focused on Problem Solving Therapy and PPD demonstrated a reduction in postpartum depression and increase in self-efficacy in Hispanic/Latin women.

Another study on minority women found that higher levels of mastery, self-esteem, and social support were associated with lower levels of PPD symptoms (Julian et al., 2023). Mastery – feeling as if things are under the person's control (Julian et al., 2023) – could be improved by teaching autonomic system regulation. It is possible that education on improving vagal tone based on personal HRV data may add to women's self esteem and feelings of mastery.

The heart and brain have a bidirectional communication mediated by the autonomic nervous system which informs the mechanism of pathology in depression and arrythmia (Fang & Zhang, 2024). HRV adds diagnostic value by differentiating between postpartum depression (PPD) and adjustment disorder leading to accurate treatment (Shinba et al., 2024). Higher levels of prepartum supradiaphragmatic reactivity were found to be predictive of higher levels of depressive symptoms in the *Patient Health Questionnaire – 9* (PHQ-9) (Singh Solorzano & Grano, 2023). Perceived parenting stress, not symptoms of depression, was associated with lower

HRV (Parisi et al., 2024). Therefore, utilizing HRV to assess autonomic nervous system reactivity as a screening tool has the potential to not only reveal risk for PND, but also to inform interventions by using relatively accessible technology.

HRV measures during the third trimester predict stress and depressive symptoms postnatally (Kishan et al., 2023). An association was found between lower HRV and higher self-reported symptoms of depression and anxiety postnatally (Brandes-Aitken et al., 2024). Therefore, psychoeducation regarding HRV has the potential to affect the mother-child relationship. A mother's autonomic nervous system may influence her child's neurophysiology through co-regulation (Brandes-Aitken et al., 2024). Mothers with lower HRV had 3-month-old infants with lower HRV (Brandes-Aitken et al., 2024). This social aspect of regulation can be affected by perinatal depression symptoms.

Therefore, measuring HRV throughout pregnancy would reveal personal changes in vagal tone, equipping the mother with tools readily available to not only learn about her body responses but also make personal changes, increasing autonomy and mastery, during a time of a felt sense of loss of control. With the increase in technology available to provide reliable information, the need for more screening tools can be addressed in a simple and physiologically informative way.

Biblical Integration

Scripture Evidence for Support

The Bible says that YHVH's love is greater than a mother's love. Isaiah 49:15 states, "Would a woman forget her nursing child, and not have compassion on the son of her womb? Though they forget, I never forget you" (Institute for Scripture Research (ISR), *TS 2009*). Comparing the love of a mother with the love of the Father provides greater understanding of the

bigger picture. Mothers can often be overwhelmed with the expectations placed upon them, especially for Hispanic women who internalize marianismo. For women who believe in the truth of Scripture, this verse reminds that even in their lack they are not forgotten.

Scripture also demonstrates that His children have the chance to achieve co-regulation with YHVH. Psalm 34:18 states, "Qoph יהוהis near to the broken-hearted, And saves those whose spirit is crushed" and 2 Corinthians 1:3-4 states, "Blessed be the Elohim and Father of our Master יהושע Messiah, the Father of compassion and Elohim of all comfort, who is comforting us in all our pressure, enabling us to comfort those who are in every pressure, through the comfort with which we ourselves are comforted by Elohim." Even when things seem overwhelming, as in PPD, the child of YHVH can rely on the Truth of Scripture and remember that He comforts.

Additionally, He is a safe presence near the ones with a broken heart. His children learn to self-regulate as they interact in co-regulation with YHVH, who is the ultimate safe presence to a person who is suffering (Dana, 2021). The ultimate comforter knows pain and suffering and can hold His child through it, as demonstrated in the acquaintance with suffering through His son (Isaiah 53:3). Leading perinatal depression expert Karen Kleinman's emphasis on holding the mother by being present through the circumstance (2025) is related to the compassion mentioned in 2 Corinthians 1:3-4, being comforted in all pressures.

Cultural Sensitivity in Biblical Counseling

In light of a Biblical integration in counseling, it is important to have cultural awareness regarding the role many Hispanic/Latino women assume in families. One particularly important aspect is the belief that the woman is spiritually superior to the man (Sampson et al., 2021). Another is the necessity to achieve a balance between a mother's needs and respecting the family

structure. Having cultural sensitivity leads the Christian counselor to address the concept of spirituality carefully, so as not to disrupt the therapeutic alliance based on Scriptural beliefs.

While recommended treatment for PPD is Cognitive Behavioral Therapy (CBT) and/or Interpersonal Therapy (IPT) (Scrandis, 2024), Biblical integration in light of previous cultural sensitivities can bring about healing in the spirit and the soul. If psychotherapy is ineffective, selective serotonin reuptake (SSRI's) are recommended as the next line of defense (Scrandis, 2024). Women may struggle with taking medications while pregnant or breastfeeding, making much room for holding, acceptance, and support within the therapeutic relationship. Ultimately, a cultural awareness and sensitivity is highly necessary to bridge the gap between screening, diagnosing, and treatment.

Topics for Future Research

Most research previously discussed emphasized low-income Hispanic women. There are virtually no articles focused on middle-income Hispanic women in the United States, making this an underrepresented group within the minority.

Further, understanding of psychological and physiological mechanisms behind the relationship between ANS functioning and peripartum depression is necessary (Solorzano & Grano, 2023). How risk factors, such as fear of childbirth, impact third trimester maternal stress need to be determined (Kishan et al., 2023). There is also a need to know how maternal HRV changes depending on moods and emotions (Brandes-Aitken et al., 2024), HRV changes throughout pregnancy, and comparing self-report and HRV screenings. In addition, standardizing HRV protocols for future studies (Byfield et al., 2025) to ensure comparable results is necessary.

Conclusion

Key findings from the literature reveal increased risk of PND for Hispanic women, yet not enough screening or interventions (Reilly et al., 2023). There is a need for PND research to include middle-income Hispanic women, given their absence from the literature. Implications for human services practice include the increased availability of screening and intervention tools before the problem becomes diagnosable. This would allow for increased knowledge on how to hold a woman in need (Kleinman, 2025).

These findings relate to the research question by addressing a niche not explored in the literature and suggesting screening and intervention tools useful for this population (Boama-Nyarko et al., 2024; Groer et al., 2024; Julian et al., 2023; Reilly et al., 2023). Expanding screening tools which measure physiological components linked to PND has the potential to make a difference in the lives of women who are struggling yet silently suffering.

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