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Postpartum Depression Risk Factors and the Role of Telehealth in Screening and Intervention

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Postpartum depression (PPD) is defined as a depressive episode occurring within the first year after delivery. This study aims to identify risk factors associated with higher Edinburgh Postpartum Depression Scale (EPDS) scores and evaluate the impact of a 3-week postpartum telehealth appointment on these scores. A retrospective chart review was conducted on 252 patients who delivered at a single academic center, with 114 deliveries occurring before and 138 after the implementation of the telehealth visit. Of these, 106 patients completed the telehealth visit. Data on patient demographics, pregnancy, maternal health, and delivery were collected. Statistical analyses were performed using ANOVA and student's *t*-test, with a significance threshold of $p < 0.05$. The results showed no significant correlation between EPDS scores and maternal or gestational age at delivery, parity, type of delivery, complications, or NICU admission. However, Black patients had significantly higher EPDS scores compared to other racial groups ($p = 0.038$). Patients with any mental health diagnosis ($p < 0.01$) and those with a history of postpartum depression ($p < 0.01$) also had significantly higher EPDS scores. Implementing the postpartum telehealth visit did not

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result in a significant decrease in EPDS scores, nor was there a significant difference between patients who completed the visit and those who did not. This study underscores the need for additional or alternative interventions to reduce the risk of postpartum depression effectively.

Keywords: postpartum depression, perinatal depression, maternal mental health, racial mental health disparities, delivery trauma, telehealth implementation

Postpartum depression (PPD) is a major cause of morbidity and disability for women around the world. Historically, PPD has been defined as a major depressive episode that occurs within 1 year of delivery (Carlson et al., 2024). The criteria for a depressive episode are similar to those outside of pregnancy, including distressing symptoms such as depressed mood, loss of interest, sleep or appetite changes, and impaired concentration, which are present during the same two-week period and a significant change from prior functioning (American Psychiatric Association, 2013). Recently, the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) has recognized peripartum depression as any depressive episode that occurs during pregnancy or in the first year postpartum and, therefore, includes postpartum depression (American Psychiatric Association, 2014).

The pathophysiology of PPD results from a combination of many factors, including genetic, environmental, and neuroendocrine changes. Environmental risks include a history of mental health disorders, adverse childhood events, and trauma. Neuroendocrine changes to the hypothalamic-pituitary-adrenal axis after delivery also can cause mood changes (Dennis et al., 2024).

PPD is prevalent, impacting nearly one in seven women during pregnancy or within the year after delivery (Carlson et al., 2025). Globally, it is estimated to affect approximately 17% of the postpartum population (Wang et al., 2021), which notably equates to more cases per year than women with breast cancer or diabetes (Accortt & Wong, 2017). It is important to note that up to 50% of women who experience symptoms of PPD remain undiagnosed. This problem is only continuing to grow. In the last decade, the prevalence of PPD has increased significantly across all racial, ethnic, and socioeconomic subgroups of the population (Khadka et al., 2024).

Given the high and growing prevalence of PPD, it is crucial to understand the potential impacts of this disease. PPD can lead to suicidal thoughts in 5-14% of patients, which is extremely important as suicide accounts for up to 20% of postpartum deaths (Lindahl et al., 2005). Patients with PPD are also at increased risk of causing infanticide (Dennis et al., 2024). Another consequence of PPD includes decreased rates of breastfeeding, which can lead to difficulties in bonding between mother and infant and further worsen PPD severity (Henshaw, 2023) as well as negative health consequences for the infant (Stein et al., 2014). Women who suffer from PPD are also at risk for developing a mood disorder outside of pregnancy, having worse physical recovery from pregnancy, and engaging in substance abuse (Shorey et al., 2018). With the prevalence of PPD so high and its impact so great, more opportunities for screening, identification, and treatment are needed.

Prior research has investigated ways to optimize screening strategies for PPD. Currently, several patient questionnaires are in use, including the Edinburgh Postnatal Depression Screen (EPDS), Patient Health Questionnaire -9 (PHQ-9), Beck Depression Inventory, and Kessler Psychologic Distress Scale (Wells, 2023), although there is conflicting evidence about whether one of these tools is superior. A 2017 systematic review of over 140 studies found no significantly superior method of screening patients (Ukatu et al., 2018). However, a 2022 systematic review concluded that the EPDS was the superior screening tool (Park & Kim, 2023).

In addition to the lack of consensus on the best tool, there is no standardized timing or frequency to screen patients for PPD. Most practices screen patients with depression questionnaires during prenatal visits to help identify patients at increased risk of mood disturbances (Accortt & Wong, 2017). The American College of Obstetricians and Gynecologists (ACOG) recommends screening patients twice prenatally and again at postpartum visits but does not specify the frequency of postpartum screenings (“Screening and Diagnosis of Mental Health Conditions During Pregnancy and Postpartum,” 2023).

The frequency of postpartum appointments varies widely among patients. Attendance at these appointments is also highly variable. A recent National Institutes of Health (NIH) systematic review found that the postpartum visit attendance rate ranged from 25 to 97%, with the average attendance being 72% (Attanasio et al., 2022). However, patients with lower socioeconomic status, lack of insurance, and geographic barriers have decreased attendance rates at

these visits (Ware et al., 2024). This is a growing problem as the maternity healthcare deserts continue to grow in the United States.

In the wake of the COVID-19 pandemic, telehealth utilization increased significantly across all areas of medicine, including postpartum care. Initially from necessity, telehealth was found to be satisfactory for many patients and continues to be utilized in conjunction with in-person visits for many practices (Marshall et al., 2023). Multiple meta-analyses found that telehealth can significantly decrease PPD incidence and severity, although the degree of impact varies with the specific telehealth practices (Liu et al., 2022; Zhao et al., 2021). Nevertheless, a superior method or timing of appointments has yet to be identified. When specifically looking at patient satisfaction, text messaging interventions have been shown to have very high patient satisfaction rates (Lawson et al., 2019).

Overall, there is a lack of recent research looking into the effectiveness of telehealth interventions in decreasing the rate and severity of PPD. This research was founded on the need to address this gap. This study had two objectives: first, to identify which patient or delivery factors correlated with significantly higher EPDS scores at the comprehensive postpartum visit, and second, to assess if implementing a 3-week postpartum telehealth visit for all patients improves EPDS scores at the comprehensive postpartum visit.

Methods

A retrospective chart review identified patients who delivered at a single academic hospital over 6 months. The timeframe was selected so that the implementation of the 3-week telehealth was the midpoint, thus dividing the patients into before and after cohorts. Exclusion criteria included neonatal demise, transfer from outside hospital, or ICU admission around time of delivery. Information regarding patient demographics, maternal health characteristics, delivery information, and Edinburgh Postnatal Depression Score (EPDS) scores was collected. The final EPDS score was recorded at the 6-week comprehensive postpartum visit. Statistical analysis was completed with student's *t*-test and ANOVA as appropriate, with $p < 0.05$ as significant.

Results

A total of 252 patients were identified, with 114 divided before and 138 after implementing the 3-week telehealth appointment. The average age of the

patients was 30.50 years (*SD* = 5.48), which did not correlate with 6-week postpartum EPDS (r = -0.09, p = 0.16). This held for patients at extremes of age, less than 20 years, or 40 years and older (n = 16, r = 0.24, p = 0.37). Among the patients, 102 were nulliparous, and 152 were multiparous. There were 12 documented IVF pregnancies. The racial and ethnic distribution of the patients was 58% White, 17% Black, 13% Hispanic, and 12% Other. Antepartum admissions prior to delivery were documented for 42 patients.

Regarding mental health, 79 patients (31%) had both anxiety and depression reported in their medical history. An additional 32 patients carried a diagnosis of anxiety alone, and another 20 carried only a diagnosis of depression. Another mental health disorder was present on the problem list of 41 patients, including ADHD, bipolar disorder, and substance use disorder. A documented history of postpartum depression was noted in 31 patients.

The average gestational age at delivery was 38.27 weeks (*SD* = 3.07), which was not significantly correlated with 6-week postpartum EPDS (r = 0.001, p = 0.86). Vaginal deliveries were recorded for 170 patients, and 81 had cesarean sections, of which 56 (69%) were unscheduled, and 11 (14%) were emergent cases. Multiple gestation deliveries were documented for three patients, all of whom were scheduled cesarean sections. One vacuum-assisted delivery was documented. Delivery complications were recorded for 40 cases (10 shoulder dystocia, 11 emergency cesarean sections, 18 other, and 1 neonatal code). NICU admissions after delivery were noted for 43 patients' infants. A documented EPDS at their initial visit was recorded for 238 patients (94%), with an average score of 5.65 (*SD* = 4.75). Every patient completed an EPDS at their comprehensive postpartum visit, with an average score of 4.79 (*SD* = 4.95).

The statistical analysis regarding demographics, maternal health, and delivery factors is depicted in Table 1.

Table 1

Comparison of Postpartum EPDS Scores

	Average Postpartum EPDS	Statistics
Nulliparous	5.42 (*SD* 5.25)	*t*-test $p = 0.097$
Multiparous	4.37 (*SD* 4.72)	
Delivery Complication	6.03 (*SD* 4.74)	*t*-test $p = 0.087$
No Complication	4.56 (*SD* 4.97)	
NICU Admission	4.86 (*SD* 5.29)	*t*-test $p = 0.92$
No NICU Admission	4.78 (*SD* 4.90)	
Vaginal	4.65	ANOVA $p = 0.26$
Unscheduled CS	5.54	
Scheduled CS	3.68	
Black	6.36	ANOVA $p = 0.038$
Hispanic	3.13	
White	4.59	
Other/Unknown	5.20	
Anxiety & Depression	6.53	ANOVA $p < 0.01$
Anxiety	6.78	
Depression	5.15	
Other Mental Health Disorder	3.75	
No Mental Health Disorder	3.05	
IVF Pregnancy	3.08 (*SD* 2.91)	*t*-test $p = 0.22$
No IVF	4.88 (*SD* 5.03)	
Any Mental Health Disorder	6.30 (*SD* 5.19)	*t*-test $p < 0.01$
No Mental Health Disorder	3.08 (*SD* 4.05)	

	Average Postpartum EPDS	Statistics
History of Postpartum Depression	7.48 (*SD* 5.60)	*t*-test $p < 0.01$
No History of Postpartum Depression	4.42 (*SD* 4.75)	

Analysis of the impact of the 3-week telehealth visit, which had a 76% completion rate, is depicted in Table 2. No significant difference existed between those who did or did not complete a telehealth visit ($p = 0.42$). Black patients, who had significantly higher EPDSs overall, did not demonstrate a significant difference after the telehealth implementation (6.10 (*SD* = 6.60) vs. 6.91 (*SD* = 5.75), $p = 0.67$). The only subgroup that demonstrated a significant difference in EPDS after the implementation were patients who experienced complications in their delivery (4.29 (*SD* = 3.53) vs. 7.41 (*SD* = 5.26), $p = 0.043$).

Table 2

Comparison of EPDS Scores

	Pre-Telehealth AVG (*SD*)	Post Telehealth AVG (*SD*)	*p*-value
Average for cohort	5.19 (5.01)	4.51 (4.91)	$p = 0.28$
Nulliparous	5.54 (4.88)	5.35 (5.50)	$p = 0.86$
30 and younger	5.60 (5.31)	5.14 (5.60)	$p = 0.64$
>30 years	4.83 (4.75)	3.68 (3.86)	$p = 0.14$
Black	6.10 (6.60)	6.91 (5.75)	$p = 0.67$
Any Mental Health Diagnosis	6.90 (5.08)	5.85 (5.24)	$p = 0.24$
Unscheduled CS	5.00 (5.33)	5.88 (5.11)	$p = 0.54$
Delivery Complication	4.29 (3.53)	7.41 (5.26)	$p = 0.043$
NICU Admission	4.62 (4.77)	5.31 (5.59)	$p = 0.70$
Decrease in EPDS from Discharge to Postpartum Visit	-0.14 (3.72)	-0.48 (4.76)	$p = 0.75$

Discussion

This study was unique because a telehealth visit was implemented for all patients, regardless of their mental health diagnoses. The first arm of this study investigated specific patient and delivery characteristics that increase the risk for PPD. Those traits included Black race, mental health diagnosis, and history of PPD. There was no significant difference regarding parity, gestational age at delivery, IVF pregnancy, type of delivery, delivery complication, or NICU admission. These results mirrored previous literature to varying degrees. Mental health diagnoses and history of PPD have previously been found to be risk factors (Guintivano et al., 2018). On the issue of race, previous literature is mixed, with some studies finding lower rates of PPD in Black populations and others finding higher (Cannon & Nasrallah, 2019; Sidebottom et al., 2023). The finding that NICU parents did not have higher EPDS scores counters previous literature that cited those patients having up to 40% increased rates of PPD (Shovers et al., 2021).

The second arm of this study looked at the implementation of a 3-week telehealth visit. This program did not significantly impact EPDS scores at the comprehensive postpartum visit. Similarly, when looking at specific subpopulations such as nulliparity, Black race, mental health diagnosis, unscheduled cesarean section, or NICU admission, the 3-week visit did not have a significant impact. Interestingly, patients with delivery complications had significantly higher EPDS scores after the telehealth visits started. Perhaps this is due to patients having time to recall and re-experience their trauma. This study's limitation was not documenting what occurred at each telehealth visit, whether interventions were recommended, and if the patient adhered to those. A standardization of telehealth visits could have a different impact on EPDS scores.

Another limitation of this study is that the EPDS was the only screening tool. Other studies investigating postpartum depression often utilize various screening tools. Another notable limitation of this study was that there were no unified diagnostic criteria for any of the mental health disorders listed on the patient's charts. Our reviewers did not investigate who or with what criteria the diagnoses were made but noted that they were listed. Additionally, the severity of the mental health disorder was not noted. A sub-analysis of whether telehealth impacts patients with varying severity of mental health disorders would be an interesting future step.

Additionally, it is important to note that a limitation of this study was that it only addressed postpartum depression and did not address peripartum depression. This could be improved by implementing antepartum telehealth visits for patients with mood disorders that are diagnosed during pregnancy to help address their mental health both during and after pregnancy.

Conclusion

The prevalence of and risks associated with PPD are a significant part of maternal health. Identifying risk factors that may increase a patient's risk of PPD can help providers offer mental health resources during prenatal care. Some of these risk factors include Black race, mental health disorder, and a history of postpartum depression. In the postpartum timeframe, telehealth allows providers to check patients' mental health. The design of the telehealth program is important, as this study demonstrated that a single 3-week visit did not significantly improve EPDS scores.

While the implementation of a single postpartum telehealth visit was a well-intentioned first step, this study demonstrated a need for better interventions to reduce PPD. A protocol was created utilizing a smartphone app that sends patients an electronic EPDS form weekly for 6 weeks until their comprehensive postpartum visit. Upon completion, patients are provided with mental health resources and advised to reach out to their provider if they are concerned about their safety. If patients are prompted to pause to consider their mood more frequently in their immediate postpartum time, this may decrease EPDS scores at the comprehensive postpartum visit. More frequent reflection may encourage patients to seek help from family and friends if they realize their mood is low or to call their provider if they are concerned the symptoms are becoming severe. This protocol was started in mid-September, and enrollment is underway. It will be interesting to see if this protocol helps address and reduce postpartum depression, particularly for the most at-risk patient populations.

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