Demographic Characteristics Associated with Depression Severity, Suicidal Ideation and

Treatment Engagement During Pregnancy

by

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Abstract

Perinatal depression has significant negative effects on mothers and children. Several biopsychosocial factors have been associated with depression during pregnancy and postpartum. Additional information is needed not only on personal factors that affect depression risk but also those that influence use of treatment. Therefore, the purpose of this study was to 1) investigate the associations between history of childbearing, economic resources and education and elevated symptoms of depression and suicidal ideation in perinatal women and 2) to evaluate the relationships between these demographic characteristics and engagement in psychotherapy. Pregnant women completed a psychosocial assessment battery after reporting elevated symptoms of depression on a routine mental health screening at obstetric visits. Parity was positively and significantly associated with depressive symptom severity and suicidal ideation. Income was negatively and significantly associated with elevated symptoms of depression. Educational attainment was not correlated with depressive symptoms or suicidal ideation. Participants were subsequently randomized to treatment as part of an intervention study. Although this population is hard to engage in psychological treatment, no significant relationships were identified involving the demographic characteristics and early attrition from treatment. The results of this study suggest women with more children and limited financial resources require further monitoring of depressive symptoms and referral to care if appropriate. Multiparous women, in particular, warrant thorough perinatal screening of depressive symptoms including suicidal ideation.

Demographic Characteristics Associated with Depression Severity, Suicidal Ideation and

Treatment Engagement During Pregnancy

During the childbearing years, women represent one of the populations most at

risk of developing depression. Approximately 10-16% of women will experience

depression during pregnancy or postpartum (Gotlib, Whiffen, & Mount, 1989). Several

biopsychosocial factors have been associated with perinatal depression. Despite more

recent attention to this public health issue, depression during and after the time of

pregnancy remains highly stigmatized. Unfortunately, psychological and

pharmacological treatments are underutilized by women during this vulnerable time.

Depression not only affects the woman adversely, but also the development of the child.

Subsequently, it becomes imperative to identify factors associated with increased risk for

depressive symptoms in order to improve identification and treatment. Additionally,

through investigating the relationships between demographic, psychological and

behavioral characteristics, we may better determine whether these variables portend

increased likelihood of attrition from mental health care. The purpose of the present

research is to examine the relationships between previous history of childbearing (parity),

income, and education and prenatal symptoms of depression, suicidal ideation and

premature attrition from psychotherapy.

Consequences of Perinatal Depression

Consequences of perinatal depression on women. Depression around the time

of pregnancy can lead to multiple detrimental effects.   Beyond the psychological toll

depression exacts, negative maternal outcomes include inadequate weight gain during

pregnancy, less engagement in self-care activities, higher rates of smoking and substance abuse, and reduced attachments to the pregnancy (Muzik, Marcus, Herringhausen, & Flynn, 2009). If the symptoms persist, women with postpartum depression are less likely to breastfeed, more likely to misperceive infant cues and describe more challenges soothing their infants (Bifulco, Figueiredo, & Guedeney, 2004).

Moreover, suicide is a rare but serious consequence of depression. It has been estimated that 67% of those who commit suicide were experiencing a major depressive episode (Black, Winokur, & Nasrallah, 1987; Tanney & Berman, 1992). A recent study reported that 17- 28% of pregnant women attending neuropsychiatric evaluations endorsed varying degrees of suicidal ideation (SI; Newport, Levey, Pennell, Ragan, & Stowe, 2007). Current major depressive episodes, comorbid anxiety and unplanned pregnancies were significantly associated with SI. However, research investigating relationships between demographic characteristics and SI in women experiencing perinatal depression is sparse.

Consequences of perinatal depression on children. In addition to the direct negative impact on women, perinatal depression can result in multiple detrimental child outcomes. For instance, mothers who are experiencing depression during pregnancy are more likely to deliver infants with low birth weights (Wadhwa, Dunkel-Schetter, & Chicz-DeMet, 1996) which is associated with increased risk of continued difficulties from infancy through adulthood including delayed cognitive and motor development (Cummings & Davies, 1994; Goodman & Gotlib, 1999; Gotlib & Lee, 1996).

Research suggests that children of mothers with depression are two to five times more likely to develop behavioral problems (Fendrich, Warner, & Weissman, 1990). In fact, some studies have found that maternal depression is the strongest predictor of adolescent and adult depression (e.g., Goodman & Gotlib, 1999). Maternal depression has been further linked to children's over-and under-externalization of problems, difficulties with emotional regulation, anxiety, anger management issues, internalizing disorders, passivity and withdrawal (LaFreniere & Dumas, 1992). Children may have difficult temperaments and have poor problem solving strategies that may continue into adolescence (Cummings & Davies, 1994; Goodman & Gotlib, 1999; Gotlib & Lee, 1996).

Further, maternal depression negatively influences infant attachment styles. For example, in contrast with infants with mothers who do not experience postpartum depression, infants of mothers with depression are more likely to show insecure attachment styles and display elevated crying responses, decreased smiling and higher levels of cortisol in the bloodstream (Cummings & Davies, 1994; Goodman & Gotlib, 1999; Gotlib & Lee, 1996).

Given the numerous effects on mother and child, it is imperative that research focus on depression during the time of pregnancy, using methods that will identify characteristics associated with symptoms and improve treatment outcomes in women during this vulnerable period. Currently, there are a number of factors that predict depression during the time of pregnancy; however this research is not without gaps.

Biopsychosocial Factors Associated with Depression

   Biological and hormonal factors. Dysregulation of the hypothalamic-pituitary-adrenocortical axis (HPA) has been implicated, in part, in the onset of depression. Previous studies demonstrate that abnormalities in HPA axis functioning originate with excessive activity in the limbic system leading to an overabundance in the production of cortotrophic releasing hormone (CRH). Excessive levels of CRH trigger the release of abnormally high levels of cortisol. Research also indicates that heightened responsiveness to adrenocortotrophic hormone in the HPA axis results in further excessive cortisol, which have both been linked to depressive symptoms (Amsterdam, Maislin, Gold, & Winkour, 1989).

   Gender differences in biological and hormonal functioning. Gender differences in HPA axis dysregulation are important in understanding the etiology of depression. A recent study highlights this effect in a five-week investigation of remission differences in cortisol release (Binder et al., 2009). At the onset of the study, researchers administered the combined dexamethasone suppression/CRH stimulation test, an assessment of cortisol plasma in the bloodstream, to participants. The test was repeated prior to participants receiving antidepressant medication. In this study, only males exhibited significantly decreased plasma release as the tests progressed which was associated with a positive response to antidepressants. The researchers concluded that women may be at higher risk for more chronic periods of depression due to reduced physiological resilience in responding to stressful situations.

This may explain, in part, explain recent epidemiological findings, that women are 1.7 times more likely than men to experience depressive symptoms throughout their lifetime (Kessler, McGonagle, Swartz, & Blazer, 1993). Depression in women is also characterized by a lower age of onset and greater chronicity (e.g., lasting 12 month or longer).

Women have additional hormonal dispositions associated with increased risk for experiencing depression that may be particularly salient during pregnancy and postpartum. Specifically, fluctuations in estrogen, progesterone and ovarian hormones are linked to negative changes in mood, such as anxiety, irritability and depressive symptoms (Schmidt, Nieman, Grover, Muller, Merriam, & Rubinow, 1991). Unfortunately, the greatest hormonal fluctuations occur during the time of pregnancy (Goodman & Gotlib, 1999; Gotlib & Lee, 1996).

Psychosocial factors associated with depression. Beyond biological factors that place women at a higher risk for depression, it is important to examine psychosocial factors that influence psychological functioning. For example, from a diathesis-stress perspective, psychological factors such as learned helplessness, negative cognitive assumptions about oneself and the world and stressful life events in conjunction with biological predispositions, may contribute synergistically to the onset or course of depression (Goodman & Gotlib, 1999).

Several psychosocial domains relate to higher incidences of depression in women. For instance, women report experiencing more social stressors than men (Abramson, Alloy, & Metalsky, 1989; Beck, Steer, Ball & Ranieri, 1996). Women have further

described low socioeconomic status, isolation and lack of resources as chief contributors to depressed mood. Regarding the course of symptoms, women with less access to resources have limited treatment options available, which may lead to longer duration of symptoms (Das, Olfson, McCurtis, & Weissman, 2006).

Women report higher relationship stress than their male counterparts, particularly in situations involving the perception of conflict in romantic partnerships (e.g., Hammen, 2002; Hammen & Brennan, 2002). Researchers hypothesize this is a consequence of the greater degree that many women associate the quality of their relationships and estimation of self worth (Cyranowski, Frank, Young, & Shear, 2000). As such, the perceived quality of interpersonal supports, self-esteem, and risk for depression are associated by complex reciprocal relationships that are particularly germane for women.

Finally, women are at greater risk for depression as a consequence of heightened awareness of internal mood states. Research indicates strongly that women are significantly more likely to ruminate about their emotions (Nolen-Hoeksema, 1990; Strauss, Munday, McNall, & Wong, 1997). Unfortunately, rumination related to problems with few apparent solutions may exacerbate the existing problem (Nolen-Hoeskema, 1991; Nolen-Hoeskema, Morrow, & Fredrickson, 1993).

Perinatal-Specific Factors Associated with Depression

Correlates of prenatal depression. Researchers have attempted to identify the most salient characteristics related to depression during pregnancy. A recent review of the empirical literature (Lancaster, Gold, Flynn, Yoo, Marcus, & Davis, 2010) identified predictors of prenatal depression including maternal anxiety, life stress, history

of depression, lack of social support, unintended pregnancy, public insurance, domestic

violence, lower income and education, nicotine use, single status, and poor relationship

quality in studies utilizing bivariate statistical approaches. In contrast, only life stress,

lack of social support, and domestic violence continued to predict prenatal depression

when multivariate methods were utilized. As such, continued research is needed to

further understand and replicate identified risk factors for depression with this population.

Additional, the relationships between other psychosocial variables and depressive

symptoms are less well known. For example, women who have one or more children, or

multiparous women, may experience greater taxing of temporal, financial, and social

resources than nulliparous women, who do not have children. This additional strain may

result in increased risk for depression.

Correlates of postpartum depression. The relationships between psychosocial

characteristics and postpartum depression have received more empirical attention. A

meta-analysis of 44 empirical studies identified prenatal depression as the most salient

predictor of postpartum depression (Beck, 1996). Significant small to moderate

relationships exist between childcare stress, social support, prenatal anxiety, Maternity

Blues, marital satisfaction, and previous episodes of major depression and the experience

of postpartum depression. However, comprehensive research continues to be warranted

to identify further characteristics associated with the onset and course of depression

throughout the perinatal period.

Potential correlates of perinatal depression. Although these reviews identified

several more commonly investigated variables associated with depression during

pregnancy (Lancaster et al., 2010) and postpartum (Beck, 1996), there is still much left to

be learned about depression during this vulnerable period. Specifically, the

investigations of potential associations between socioeconomic diversity and perinatal

depression have resulted in mixed findings. Specifically, associations between prior

childbearing status and depressive symptoms deserve additional empirical attention. The

influence of prior children in the home is associated with increased demands, use of

resources and the need for access to childcare in order for women to engage in

independent activities. Additionally, the number of children a woman has may relate the

level of social support that is adequate for her needs. Finally, there has been limited

attention to the relationship between potential risk factors and suicidal ideation during the

perinatal period.

Related, a recent study investigated the effects of income, work prestige, level of

education, marital status and number of children on postpartum depression (Segre,

O'Hara, Arndt, & Stuart, 2007). The authors hypothesized mothers would experience

higher levels of symptoms concurrent with added responsibilities in maintaining

themselves and multiple children. This may be particularly apparent in situations with

little financial leeway in which access to social resources, education or adequate

healthcare may be more limited. This context may yield situations in which mother

experiences chronic stress. To investigate this theory 4,332 women completed a

demographics form and a depression screening instrument. Logistic regression analysis

was used to determine if any of these factors were significant predictors of postpartum

depression. Both lower socioeconomic status and higher number of children were significant predictors of postpartum depression.

Additionally, a recent study explored the effect of the number of children on maternal depression (Rajaratnam, O'Campo, O'Brien, & Muntaner, 2008). It was posited that parenting multiple young children could create isolation and subsequent depression in through two pathways. First, researchers hypothesized that mothers in high crime and poverty areas would purposely isolate themselves and their children due to safety concerns.   The second form of isolation that they hypothesized to contribute to depression was not a purposeful act from the mothers on behalf of their children. Rather, by nature of being busier and having young children with multiple demands, they would have fewer social interactions and subsequently, experience depressive symptoms.

To investigate their theory, they studied 266 women in the Baltimore city area who were parents of three or four children under the age of attending preschool (Rajaratnam et al., 2008). Each woman completed the Center for Epidemiological Studies-Depression scale (CES-D; Radloff, 1977), a self-report screening measure of depressive symptoms. In order to assess their level of isolation, each woman reported the number of people they had spent significant amounts of social time with during the last month. If the individual reported that she had zero persons with whom she interacted socially within the last month, she was termed socially isolated (9%). Social isolation was significantly associated with increased symptoms of depression.

As a result, a higher degree of social support may be needed for women with multiple children in order to provide them with adequate protection against depressive

symptoms. Since these women all had young children requiring high levels of care, it is

noteworthy that those with greater use of social networks had more adaptive mental

health responses (Rajaratnam et al., 2008). More children may increase the need for

engagement with a larger social network. However, it is important to recognize this

requires additional effort for the woman. Given the multiple demands on time and

declines in energy during the perinatal period, it is likely that many women with

depression may find it difficult to invest the time needed for these contacts.

This theory has been partially supported in an early study done by Gove &

Geerken (1977), in which level of demands (i.e. demands on time, interruptions by

others, inability to find peaceful time alone), attitudes toward being alone and feelings of

loneliness were compared between couples aged 18 to 60. It was hypothesized that there

would be the least number of demands on employed husbands, followed by unemployed

husbands, then employed wives and finally the unemployed wives. They further

hypothesized that unemployed wives would most often want to be alone and evidence the

highest levels of reported loneliness with employed husbands at the other end of the

spectrum.

The number of children in the household was correlated with level of perceived

demands, loneliness and feelings about time alone (Gove & Geerken, 1977). Further, a

larger number of children was significantly correlated with high levels of demands in

both employed and unemployed women with the highest rates reported by unemployed

women. High demands were significantly associated with feelings of loneliness and

immersion in parenting tasks. Moreover, women described an increased desire to be

alone. In women, high levels of demands, loneliness, and desire to be alone correlated with a large number of children and depressive symptoms in these women. However, this pattern has not been investigated perinatally.

Recommendations for Care

Given the negative consequences associated with depression during pregnancy and postpartum for women and their families, engaging women in mental health care is a public health imperative. Better understanding the characteristics most associated with perinatal depression may positively enhance the ability to identify those most at risk and link them with care, if necessary (Flynn, Blow, & Marcus, 2006).

Barriers Affecting Engagement in Treatment

Despite the pervasiveness of depression during the perinatal period, less than 14% of women with elevated symptoms of at-risk women engage in mental health interventions (Marcus, Flynn, Blow, & Barry, 2003). Additionally, only one-third of women with histories of major depressive episodes who are experiencing a relapse, receive mental health interventions during this critical time (Flynn et al., 2006). Subsequently, it is important to understand potential barriers to treatment engagement and retention.

Potential barriers of great import include perceptual barriers to treatment. In a study, perinatal women reported a number of psychological barriers in regards to help-seeking behaviors (Jesse, Dolbier, & Blanchard 2008). Specifically, participants reported lack of trust, stigma and concern about being judged, health care dissatisfaction, and not

wanting help as the main reasons for not seeking therapy. Offering support and trust were recommended as strategies that could help overcome barriers.

In contrast, a study done by O'Mahen & Flynn (2008) found structural rather than attitudinal or knowledge barriers, were more frequently cited factors preventing perinatal women from seeking treatment. For example, mental health providers were commonly unavailable in locations near perinatal woman. Similarly, Hall and colleagues found that many perinatal women experiencing depression concurrent with limited financial resources experienced an excess of practical difficulties and increased perception of treatment use as more burdensome (Hall, Williams, & Greenberg, 1985).

Level of education has also been shown to be related to attrition from studies examining predictors of postpartum depression (Oppo et al., 2009). Oppo and colleagues found that premature attrition from the research was more likely to occur in perinatal depressed women with less education immediately after enrollment.

Additional demographic characteristics may be central to further understanding the uptake and adequate use of mental health resources. Specifically, multiparity and limited finances may further increase barriers. The interrelationships between number of children and availability of disposable economic resources may be associated with reduced rates of entry into mental health care. Further, it is possible that even in cases that women elect to initiate treatment, psychological and demographic characteristics may relate to premature dropout. However, variables related to treatment disengagement, particularly with non-pharamacological interventions, during the time of childbearing has received limited empirical attention.

Summary of the Relevant Literature

Depression is common during the time of childbearing and is severely detrimental to both mother and child. Several factors are associated with depression during this time including gender- and perinatal-specific psychological characteristics, past episodes of depression, maternity blues, comorbid anxiety, lack of childcare and limited social support. Nevertheless, there remain significant gaps in the empirical literature related to the relationships between parity, education, and income and the experiences of perinatal depression, suicidal ideation, and treatment persistence.

Purpose of the Present Study

The purpose of the present study was to evaluate demographic and cultural factors that may be associated with prenatal depression and suicidal ideation and evaluate their relationships to premature attrition from therapy. This research addresses existing methodological and theoretical gaps regarding the relationships between the presence of previous children and socioeconomic variables and aspects of perinatal depression. Additionally, there is limited data on what factors are associated with premature disengagement from therapy.

The knowledge to be gained as a result of this study could prove to better assist care providers in identifying women most at risk for perinatal depression. Further, it is imperative to determine characteristics associated with adequate engagement in mental health care in order to improve the ability to attract and retain this hard-to-reach population.

Research Hypotheses

This study was designed to 1) evaluate the relationships between demographic characteristics and the experience of perinatal depression and 2) ascertain whether these characteristics are associated with premature disengagement from treatment. Based on the empirical literature, the following hypotheses were tested:

Hypothesis 1. Women with more children will be significantly more likely to experience prenatal depression and symptoms of suicidal ideation.

Hypothesis 2. Women with lower household incomes will be significantly more likely to experience prenatal depression and symptoms of suicidal ideation.

Hypothesis 3. Women with less education will be significantly more likely to experience prenatal depression and suicidal ideation.

Hypothesis 4. Women with more children, lower income, and fewer years of education will be significantly more likely to prematurely dropout of therapy.

Method

Participants

Women were recruited from five obstetrics and gynecological clinics from a large Midwestern hospital for the purposes of evaluating a therapy intervention to treat perinatal depression. Women were qualified for the baseline eligibility interview portion of the study if they were: 1) 18 years of age or older; 2) in their third trimester of pregnancy; and 3) scored greater than 12 on the Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987). Women were eligible for the treatment portion of the study if they met the above criteria and Diagnostic and Statistical Manual-

IV (American Psychiatric Association, 2000) criteria for a current major depressive episode. Women were not eligible for the baseline interview if they: 1) were currently using mental health services or medication for depression; 2) did not speak English; 3) were dependent on substances or alcohol; 4) had a developmental disability; 5) intended to move from the area; 6) experienced complications during pregnancy; or 7) were experiencing domestic violence.

Procedures

Women were initially approached by research staff at their obstetrics office. Research assistants explained study procedures to potential participants and initiated the informed consent process. Women interested in the study completed the EPDS and a general health questionnaire developed for this research.

Based on these assessments, women with EPDS scores above 12 were subsequently contacted for a baseline interview that could be completed in their home, obstetrics office or by phone to determine whether they met full eligibility requirements for the treatment study (e.g., were currently experiencing an episode of major depression) and to collect baseline psychosocial data. Clinicians with at least a master's degree performed the 60 to 90 minute interviews. Participants were compensated $30 for completing the assessment battery.

Participants who met treatment study criteria (n=29) were randomized to either the tailored cognitive behavioral therapy (CBT) experimental group or to a treatment as usual group (TAU) control group that received information and referral and was at liberty to seek treatment. The research team completed post-intervention assessment batteries

after completion of the eight-week intervention phase. Participants were compensated

$30 for completing the follow-up interview. The Institutional Review Board of the

University of Michigan approved the research protocol and procedures.

Intervention. CBT is a mode of psychotherapy that has been empirically

supported for the individual treatment of depression (Butler, Turner, Kaye, Ruffin, &

Downey, 2005). The intervention format used in this study consisted of eight sessions

lasting approximately 45 minutes each. In order to reduce barriers to treatment

engagement, the first three sessions were delivered at obstetrics offices. Subsequently,

the treatment group received further sessions by telephone, in their homes or other

locations identified by participants. Consistent with the CBT modality, the content of the

intervention involved cognitive restructuring, behavioral activation, problem solving,

increasing social support and communication skills training. In order to further tailor the

approach to this population, the treatment incorporated continued assessment of resource

needs and psychoeducation in the areas of pregnancy, delivery, and parenthood.

Measures

Instruments. The study-specific general health survey was used as part of the

initial eligibility screen. This measure is a 12-item questionnaire assessing ethnicity,

income, level of education, age, marital status, current and previous medication and

therapy use, insurance, adoption plan, and number of prior children.

The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987) was used as

a depression screening tool to identify potential participants for this study. This is a valid

and reliable 10-item measure that assesses mood during the perinatal period that has been

shown to be responsive to treatment and de-emphasizes physical symptoms of depression that may be normative during pregnancy (Matthey, 2004). A cutoff score of 12 and over is recommended to identify women at significant risk for experiencing a major depressive episode (Eberhard-Gran, Eskild, Tambs, Opjordsmoen, & Samuelson, 2001).

The mood disorder section of the Structured Clinical Interview for DSM Disorders (SCID; First, Spitzer, Gibbon, & Williams, 2002) was used to determine current and past history of major depressive episodes to determine eligibility for the treatment study. The SCID is a well researched semi-structured interview that is a widely used reliable and valid measure currently used as the standard for diagnosis of mood disorders. (Segal, Kabacoff, Hersen, Van Hasselt, Ryan, 1995)

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) was used to measure the severity of depressive symptoms and the presence of suicidal ideation. The BDI-II is a 21-item depression screen assessing symptoms experienced during the last two weeks. The BDI-II is a reliable and widely used instrument and has demonstrated utility with perinatal women (Lee, Yip, Leung, & Chung, 2001)

Engagement in treatment. Clinicians providing the CBT sessions maintained attendance session logs at the end of each visit. For the purposes of this study, sufficient engagement in treatment was defined as participating in five or more therapy sessions. Women who completed fewer sessions of therapy were characterized as prematurely disengaged.

Data Analysis

Descriptive statistics were calculated using mean and percentages. Pearson

product moment correlations were used to determine the strength of relationships

between demographic characteristics (number of children, income and education) and

depression related assessments (e.g. BDI-II total and suicidal ideation) for all women

screened for potential participation in the treatment study. For the purposes of this

research, analyses of treatment engagement are restricted to women assigned to the

experimental CBT condition. Between-group t-tests were used to compare the

demographic characteristics of women who completed the treatment and those who

dropped out prematurely.

Results

One hundred and ten women satisfied preliminary eligibility criteria based on

elevated EPDS scores and responses to the general health questionnaire and completed

the baseline interview. Women primarily identified as Caucasian or African American.

Nulliparous women made up 34.8% of the population. Most women had at least a high

school education. A large percentage of participants described an annual household

income below $20,000. See Table 1 for demographic characteristics. The mean BDI-II

for women completing the baseline screen was 23.85 ($SD = 9.7$) and 19% of all women

endoreded some degree of suicidal ideation.

Regarding participants randomly assigned to the intervention research study, 29

women were enrolled in CBT, 11 were assigned to the TAU condition, and three women

refused randomization. In the treatment condition, 14 participants engaged in a sufficient number of treatment sessions and 15 disengaged prematurely.

Parity, Depressive Symptoms and Suicidal Ideation

Regarding parity, the number of previous births was significantly and positively correlated with the severity of prenatal symptoms of depression ($r = .329$, $p < .01$) and SI ($r = .282$, $p < .01$). The magnitudes of the relationships between parity and symptom severity and SI were medium and small, respectively. Therefore, Hypothesis 1 that parity would be associated with increased depression severity and suicidal ideation was confirmed. The correlations between demographic and depression-related characteristics are detailed in Table 2.

Income, Depressive Symptoms and Suicidal Ideation

Pearson correlations were performed to determine the interrelationships between income, depression symptoms and SI. A small significant negative correlation between severity of depressive symptoms and income was found ($r = -.190$, $p = .047$). No significant association was found between income and suicidal ideation. Thus, Hypothesis 2 that income would be significantly associated with depressive symptom severity and SI was partially supported.

Education, Depressive Symptoms and Suicidal Ideation

Pearson correlations failed to detect significant associations between education and depressive symptoms and suicidal ideation. Therefore, Hypothesis 3 that education would be significantly related to depressive symptoms and SI was not supported.

Parity, Income and Education and Treatment Persistence

Between-group t-tests were conducted to analyze relationships between parity, income, and education and treatment engagement. None of the demographic characteristics evaluated yielded significant results. Therefore, Hypothesis 4 that demographic characteristics would relate to treatment persistence was rejected. Data from t-test analyses is provided in Table 3.

Discussion

The purpose of this research was to investigate the relationships between demographic characteristics and psychological functioning in perinatal women. Specifically, we evaluated the potential associations between history of childbearing, income, and education on depression symptom severity, suicidal ideation, and treatment persistence in relation to a tailored CBT intervention.

Parity, Depressive Symptoms, and Suicidal Ideation

Parity was moderately associated with elevated depressive symptoms, suggesting that multiparous women may be uniquely at risk for more severe forms of prenatal depression. This is significant, as more individuals are impacted by the presence of maternal depression during pregnancy. Not only are the mother and her developing fetus at greater risk for experiencing the negative psychological and physiological consequences of depression during pregnancy, but older children may also be adversely impacted. Given the association between elevated symptoms and history of childbearing, these women may also be at increased risk for the persistence of symptoms into the postpartum period, which confer additional risk for adverse parent and child outcomes.

The findings of this research are consistent with those of Rajaratnam et al. (2008) during their evaluations of postpartum women. This finding, in conjunction with the reluctance of many women and care providers to use pharmacological approaches during gestation, suggests multiparous women may need a more comprehensive mental health attention and tailored interventions prior to delivery.

An association between suicidal ideation and parity was also identified. This research extends the work of Newport et al. (2007) by identifying additional demographic characteristics associated with perinatal suicidal ideation. Several variables may explain this relationship. First, multiparous women experiencing depression experience unique social, time, and financial responsibilities during pregnancy that are not shared by nulliparous women. The literature also demonstrates relationships between parenthood and social isolation (Rajaratnam et al., 2008). This isolation may result in behavioral inhibition and further disengagement from social supports and mood enhancing activities. As a result, depression may worsen and suicidal ideation may become more pronounced.

The results suggest a need for greater attention to suicide risk with perinatal women, particularly those with a history of childbearing. It would be beneficial to provide multiple screening points for these women. The findings further underscore the importance that care providers involved in depression screening be sufficiently trained in assessment of suicidal ideation, factors associated with increased propensity of engaging in self-harm behaviors, and adequate knowledge of resources for immediate intervention and referral to care if warranted.

Income, Depressive Symptoms, and Suicidal Ideation

The relationships between income and depression related characteristics was mixed. Income was significantly associated with perinatal depressive symptoms. Specifically, low income related to greater severity of symptoms. Previous research reported similar effects in mother with young children and recently postpartum women (O'Neil, Wilson, Shaw, & Dishion, 2009; Segre et al., 2007). The present research replicates the results of a recent empirical review evaluating predictors of prenatal depressive symptoms when data were analyzed using bivariate analyses (Lancaster et al., 2010). This relationship may be explained, in part, by the additional strain on fiscal resources associated with the pregnancy and additional dependents which may serve to worsen mood. In contrast, suicidal ideation was not found to be significantly correlated with income. In sum, these findings indicate that women with lower income are at greater risk for depressive symptoms during pregnancy, but that fewer financial resources are not independently associated with greater suicidal ideation.

Unfortunately, as a consequence of limited income, women may be less included to pursue mental health care or it may not be readily available (Hall et al., 1985). This may result in greater likelihood for chronic depression. Given the public health importance of perinatal depression, empirically supported no- or low-cost community mental health resources are needed.

Education, Depressive Symptoms, and Suicidal Ideation

Education was not found to be significantly associated with depressive symptoms or suicidal ideation. This is contrary to Lancaster and colleagues (Lancaster et al., 2010)

recent review that associated lower education with depression. One potential reason for

this discrepancy may be the particular population assessed in this study. For instance,

although over 30% of women in this study had attained a college education, most were

below the poverty line. Given the average incomes reported in this study, it is possible

that women may have been less likely to work outside of the home despite the

comparably high education rates described. Further research evaluating occupational

status and with a more economically diverse sample may help clarify this finding.

Relationships Between Parity, Income, and Education and Treatment Persistence

There was no significant association found between parity, income and education

and treatment engagement. Previous studies have found that childcare, financial

resources, and education may be significant barriers to initial enrollment in treatment in

perinatal and non-perinatal populations (Hall et al., 1985). Encouragingly, the results of

this study suggest that, once perinatal women enroll in treatment, those with the

demographic profiles investigated in this study do not attrit at greater rates than those

than those without issues related to parity, income and education. One potential reason

for this may be that this study used a tailored CBT that was designed to be highly

responsive to women's needs (e.g., delivered at convenient locations, free of charge).

This may have eliminated barriers created by childcare issues and income. Further

research is needed to determine whether demographic characteristics are associated with

premature attrition from traditionally delivered psychotherapy or if CBT, in general, is

particularly attractive to this population and effective at keeping them engaged. While

parity status, income, and education were not related to treatment retention, it is

important to note that nearly half of the women enrolled in this study prematurely

discontinued despite the tailored intervention delivery format. Further efforts are

required to promote adequate use of psychotherapy by perinatal women.

Limitations of the Study

In considering these results, some limitations of the research are noteworthy. For

instance, most women in this study described very low annual household incomes.

Therefore, the observed associations may not be generalizeable to women at different

levels of income. It may have been illustrative to more fully evaluate the relationship

between suicidality and income in a more economically diverse sample. Another

methodological limitation is that the associations between demographics, depressive

symptoms, and suicidal ideation were analyzed using a cross-sectional, correlational

approach. Thus, the causal relationships between these variables are unknown as well as

the course of depressive symptoms from pregnancy to postpartum. Specifically, the

sample size used to address treatment engagement was small and may have limited the

power to detect significant relationships between demographics and treatment

persistence. Future research evaluating etiological models and with larger sample sizes

would be useful.

Strengths of the Study

Despite the concerns described, this research offers several contributions. First,

the present research examined multiple associations between demographic factors and

depression some of which were novel to research during pregnancy or had previously

resulted in mixed research findings. Second, this study is one of the first to evaluate features associated with suicidal ideation during the perinatal period.

In relation to treatment utilization behaviors, although previous research has identified barriers to intervention initiation, the present research explored treatment persistence, a critical area that has not been the subject of substantial empirical inquiry in perinatal populations. Knowledge of factors that influence affect treatment engagement, such as those examined in this study, could result in more individualized, and responsive, forms of treatment.

Future Research

From the results of this study, it is imperative that future research addresses a number of factors relating to perinatal mental health issues. First, it is important to examine whether parity is significantly associated with actual engagement in self-harm behaviors in pregnancy. For example, it would be helpful to understand whether, despite elevations of suicidal ideation, current children might serve as a barrier to suicide related behavior. The development of theoretical models and empirical investigations to further explore relationships between parity and suicidal ideation would be helpful. Further, although intervention research commonly evaluates the reduction of depressive symptoms, it is important to determine whether the specific symptom of suicidal ideation responds to treatment.

A more comprehensive understanding of the direct and indirect relationships between additional psychosocial variables is needed. For instance. perceived relationship stress and social isolation may moderate the relationships between parity status and

depression. Identification of these characteristics may serve as potential targets to improve functioning around the time of childbirth.

Conclusions

In summary, the hypotheses investigated in this study had mixed results. Parity status and income were related to increased depressive symptom severity. Parity was specifically associated with elevated suicidal ideation during pregnancy. In contrast, education was not related to these symptoms. Demographic characteristics were not associated with increased likelihood to dropout of treatment. However, attrition rates observed in this study were high, despite the use of a tailored intervention aimed at reducing commonly reported barriers to care. Overall, this study provides novel contributions. By gaining a deeper understanding of the nature of perinatal depression, it may be possible to improve identification of women at greatest risk and consider these factors in intervention development targeting longer-term improvement.

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Author Note

Table 1

Demographic Characteristics

Variable	Mean (SD)	% (n)
Demographics		
Age	27.16 (6.3)	
# of other biological children	.94 (1.2)	
Married, Live in partner or Romantic Relationship		52.3(67)
Not married		47.7(61)
Race		
Caucasian		41.4(53)
African American		47.7(61)
Asian American		4.7(6)
Multi-racial		.8(1)
Other race		5.5(7)
Education		
8 years or less		1.6(2)
9-11 years		25.0(32)
High school graduate		27.3(35)
13-16 years		20.3(26)
College graduate		11.7(15)

Beyond college graduate	14.1(18)
Income (total before taxes per year)	
Less than 10,000	39.4(50)
10,000-19,999	22.0(28)
20,000-39,999	9.4(12)
40,000-59,999	4.7(6)
60,000-79,999	4.7 (6)
80,000 or more	5.5(7)
Don't know	11.8(15)
Refused to answer	1.6(2)

Table 2

Relationships between demographic characteristics, depression symptom severity and suicidal ideation

Demographic	Depression Severity	Suicidal Ideation
Parity	.33**	.28**
Income	-.19*	-.11
Education	-.17	-.09

Note. $* = p < .05$ $** = p < .01$

Table 3

Comparison of Demographic Characteristics in Treatment Engagement and Treatment Disengagement

Demographic	*t*		
	Parity	Income	Education
Treatment Disengaged	.37	1.13	.45

Note. No significant differences were observed