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Depressive Symptoms and Birth Outcomes among Pregnant Teenagers

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Abstract

Study Objective—Few studies have examined the effects of maternal depressive symptoms among adolescent women. The purpose of this study was to investigate the impact of depressive symptoms on birth outcomes of infants born to adolescent mothers.

Design—The medical records of pregnant adolescent patients were examined. Information about maternal depressive symptoms and birth outcomes was collected.

Setting—Data were collected at Washington Hospital Center, a nonprofit, community-based hospital that serves residents throughout the Washington, DC area.

Participants—Participants were 294 African-American and Latina adolescent mothers. Mean age was 16.2 years (standard deviation [SD] 1.4). Based on self-reports of depressive symptoms, adolescents were categorized by the following: no reported symptoms, depressive symptoms without SI/SA (suicidal ideation or attempt), and depressive symptoms with SI/SA.

Main Outcome Measures—Infant birth weight and gestational age at delivery.

Results—Over one-quarter of pregnant adolescents in this study reported symptoms of depression. Adolescents reporting depressive symptoms with SI/SA delivered babies that weighed 239.5 grams (98.3% confidence interval [CI] 3.9 to 475.1) less than babies born to mothers reporting depressive symptoms without SI/SA. There was no association between reported symptoms and gestational age.

Conclusions—Results suggest that compared to nonpregnant teens and adults, pregnant teens may have an increased risk for depression. Additionally, pregnant adolescents with suicidal ideation are at greater risk for delivering infants of lower birth weight compared with teens reporting depressive symptoms without SI/SA and teens reporting no symptoms. This study supports the need for early screening and treatment of depression for young pregnant women.

Keywords

Teen Pregnancy; Depression; Birth outcome

Introduction

Major depression is one of the most pervasive mental health disorders affecting women during the child-bearing years.¹ A clinical diagnosis of major depression is based on the presence of a depressed mood and/or loss of interest in activities, along with other symptoms including fatigue, feelings of worthlessness, and recurrent thoughts of death.^{2,3} Few studies have examined depression among pregnant adolescents, even though published reports suggest that compared with pregnant adults, teen mothers are at proportionately higher risk for developing depression.^{4,5}

Prevalence rates of depression are much higher among pregnant teens, with rates estimated between 16% and 44%.⁵ The lifetime prevalence of major depression among nonpregnant adolescents is reportedly between 5% and 20%, depending on the sample. Prevalence estimates of depression may vary because of minor differences in sample composition (eg, urban versus rural) and how depression is operationalized.^{6,7} Estimates of lifetime risk of depression among pregnant adult women also vary, with rates between 6% and 17%.⁸

Research has identified a number of significant risk factors that predict onset of major depression, including family history, childhood adversity, social isolation, and exposure to stressful life experiences (eg, trauma, abuse, loss). Exposure to stressful events is greater among people with a history of depression than among individuals without such a history.⁸ The lives of adolescents who become teen mothers differ from those of nonpregnant teens.⁹ Adolescent mothers are disproportionately more likely to have a history of physical and sexual abuse, live in impoverished communities, be exposed to community violence, and have restricted access to quality health care resources.^{9–12}

One of the most obvious concerns related to depression during pregnancy is the potential worsening of the condition. Untreated depression may lead to suicidal ideation and attempts. Although completed suicides are rare among pregnant women, according to available reports, rates of suicidal ideation range from 3% to 18%.¹³ Suicidal ideation and attempts are common among youth with depression. Approximately 19% of 15- to 19-year-olds have thought about suicide, and 9% of teens have attempted suicide.⁶ There are few studies documenting the rate of suicidal ideation among pregnant adolescents in the United States. Among the existing studies, rates range from 11% to 30%.^{14–16} Additionally, studies outside the United States have found that teenage mothers and women in cultures that stigmatize motherhood among single women are at higher risk for suicide.^{17,18}

Untreated depression has been associated with adverse pregnancy and birth outcomes, most notably low birth weight (LBW) and preterm delivery.^{19–22} Low birth weight and preterm delivery are of major clinical concern because they are leading causes of neonatal mortality and infant morbidity in the United States. The rate of LBW (less than 2500 g) infants in the United States increased from 7.6% to 8.2% from 2000–2005. This is an increase of 22% since 1984.²³ The rate of preterm singleton births (less than 37 weeks) has also been on the rise. The national rate was 11% in 2005, an increase of 13% since 1990. Compared with white and Latino women, African American women are reportedly at highest risk for delivering a low birth weight infant and delivering prematurely.²³ Moreover, published reports on the frequency of LBW among American women have shown that as a mother's age decreases, the frequency of LBW infants increases.²⁴ Birth outcomes are reportedly more unfavorable for pregnant teenagers less than 15 years old and for adolescent mothers with repeat pregnancies.^{25,26}

Over the past decade, an increasing number of studies have investigated the association between depression and LBW and preterm birth. The majority of studies examined birth outcomes for adult women who were depressed. Findings from these studies were mixed and inconclusive. In a retrospective study examining the effects of maternal experience of violence

and common mental disorders on neonatal outcomes among 930 pregnant teenagers (11 to 19 years old), preterm birth was found to be associated with common mental disorders. Importantly, the association between mental disorders and LBW remained statistically significant after adjusting for potential confounders. Depression, anxiety, and post-traumatic stress disorder (PTSD) were significantly associated with LBW.¹⁹ A critical limitation of this study was the timing of the interviews with the mothers. The mental health measurement was administered 4 to 48 hours following childbirth. Measurement of mental health status was possibly confounded by recall bias and emotional experiences common among new parents.¹⁹

A study examining the relationship between maternal depressive symptoms and spontaneous preterm births among 1399 adult African American women found a significant association between elevated levels of maternal depressive symptoms and spontaneous preterm birth. The rate of spontaneous birth among women with depressive symptoms was 12.7%, exceeding the rate among women nation-wide.²¹ In another study examining self-reported depression and negative pregnancy outcomes in adolescent (17 years of age and younger) and adult women, significant associations between antenatal depression and LBW and preterm delivery were found, but only in adult women.²⁰ Compared with the adolescent women, the adult sample reported significantly more adverse health behaviors (alcohol use and cigarette smoking) and had a history of poor birth outcomes. The increased frequency of high-risk behaviors in the adult sample possibly contributed to the differences found in birth outcomes between the 2 groups.

These study findings suggest that the relationship between maternal depression and birth outcomes remains poorly understood, especially for pregnant adolescents. Few studies have examined this relationship in young, low-income minority groups, who are reported to be at greater risk for poor birth outcomes. Recent census data underscore the lack of progress in reducing the rate of LBW and preterm births in the United States. Therefore, further investigation of factors associated with these birth outcomes, such as depression, is warranted.

The purpose of this study was to assess the prevalence of self-reported depressive symptoms in pregnant adolescent females, and to evaluate the effects of depressive symptoms on the birth weight and gestational age of infants born to adolescent mothers. Two primary hypotheses were generated for this study. First, it was expected that infant birth weight and gestational age at delivery would differ between adolescents reporting depressive symptoms and adolescents reporting no symptoms. Second, it was hypothesized that teenage mothers reporting depressive symptoms with suicidal ideation and attempt history (SI/SA) would deliver infants of lower birth weight and younger gestation compared with adolescents reporting depressive symptoms without SI/SA and young mothers reporting no symptoms.

Materials and Methods

Participants

The program and medical records of 294 adolescent patients enrolled in Teen Alliance for Prepared Parenting (TAPP) were reviewed for this study. Teen Alliance for Prepared Parenting is a community-based subsequent pregnancy prevention program serving primarily low-income African-American and Latina adolescent females in the Washington, DC metropolitan area. The program is housed within the Center for Adolescent Women in the Division of Women's Services at Washington Hospital Center. Teen Alliance for Prepared Parenting integrates comprehensive prenatal and postpartum clinical care and intensive case management and social support. The adolescent mothers are involved in the program throughout their pregnancy and up to 24 months following delivery.

The majority of participants were African American (76%), followed by Latina (24%). The mean age was 16.2 years (Table 1). More than 95% of the participants were from families of lower socioeconomic status and were enrolled in DC Medicaid, a government-subsidized health insurance plan. Approximately 90% of participants were experiencing their first birth. None of the participants reported receiving psychotherapy or psychopharmacological treatment at the time of intake.

Procedure

Data were examined from a 40-item psychosocial intake used by TAPP staff to screen all adolescent patients. The following 5 questions related to depressive symptoms were analyzed in this study:

1. Do you feel bad, down, sad or depressed a lot?
2. Do you ever think it would just be easier to die?
3. Have you ever thought about killing yourself?
4. Do you ever hurt yourself on purpose?
5. Have you ever tried to kill yourself?

Based on their responses to the 5 questions, participants were assigned to 1 of 3 study groups. Participants who responded “yes” to question 1 were categorized as depressive symptoms without SI/SA. Participants who responded “yes” to question 1 and any or all of the remaining 4 questions were categorized as depressive symptoms with SI/SA. Participants who responded “no” to all 5 questions were categorized as having no reported symptoms.

Statistical Analysis

The medical and program records of the 294 pregnant adolescents were included in the analysis. The statistical package used for data analysis was SPSS (version 16.0, manufactured by SPSS Inc., Chicago, IL, released on September 17, 2007). Descriptive statistics were used to examine the distribution of the demographic data. Analyses were conducted to detect differences in birth outcomes by age (>15 y vs <15 y) and race. Dependent variables were birth weight (measured in g) and gestational age (measured in wks). Univariate analyses were conducted to analyze the association between group status (no reported depressive symptoms vs any depressive symptoms, and no reported depressive symptoms vs reported depressive symptoms with SI/SA and reported symptoms without SI/SA) and birth outcomes of interest. Multivariate regression analyses were conducted to adjust for maternal age, completed prenatal appointments, and gestational age. Analysis was also conducted to examine the effects of physical abuse, sexual abuse, and drug use (alcohol, marijuana, and cigarettes) on birth weight and gestational age, by group. Significance level was set at $\leq .05$ for initial bivariate analysis (no depressive symptoms vs any depressive symptoms). Pairwise comparisons across the 3 groups were assessed using a Bonferroni correction with α set at $.05/3 = .017$. This study was approved by the Institutional Review Board at MedStar Health.

Results

Descriptive Characteristics

More than one-quarter of adolescent mothers (28%) self-reported depressive symptoms (Table 2). Seventeen percent (17%) of adolescent mothers reported items placing them in the depressive symptoms without SI/SA group. Depressive symptoms and suicidal ideation and attempt history were reported in over one-tenth of the study cohort (11%). There was no statistically significant difference in the prevalence of self-reported depressive symptoms and suicidal behavior between African-American and Latina adolescent mothers, or between

adolescent mothers below age 15 and above 15 years of age. Approximately 12% of adolescent mothers had experienced some form of abuse (physical or sexual). Less than 5% reported using marijuana, alcohol, and tobacco.

The mean birth weight of infants was 3081 g (standard deviation [SD] = 544 g). Approximately 13% of adolescent women in this study delivered a low-birth-weight infant. This finding exceeds the national average of 8.2%.²³ The mean gestational age at time of delivery was 39 weeks (SD = 2) (Table 3). Approximately 9% of adolescent mothers delivered an infant that was less than 37 weeks gestation. There were no statistically significant differences in gestational age and infant birth weight across race or between adolescent mothers below and above age 15 years.

Depression and Birth Outcomes

There was no statistically significant difference in mean infant birth weight between adolescent mothers who reported no depressive symptoms and those who endorsed any depressive symptoms (with and without SI/SA), $F(1,292) = 0.394$, $P = .530$. However, following adjustment for maternal age, frequency of prenatal appointments, and gestational age, the model predicting birth weight became statistically significant $F(4,289) = 44.01$, $P < .05$. Significance in the model was attributed to the positive association between gestational age and birth weight (ie, for each week of gestation the infant weighed an average of 171.1 g more) (95% CI = 144.7-197.5).

Analysis of infant birth weight by group yielded statistically significant differences $F(2,291) = 3.36$, $P < .05$. After adjusting for the demographic and health variables as previously described, statistically significant differences in infant birth among the 3 groups remained. Infants of mothers reporting depressive symptoms with SI/SA weighed 239.5 grams (98.3% CI = 46.3-432.7) less than infants born to mothers reporting depressive symptoms without SI/SA (Table 4). There was no statistically significant difference in the birth weight of infants born to mothers reporting depressive symptom with SI/SA and infants born to mothers reporting no depressive symptoms. There was a trend for infants born to mothers reporting depressive symptoms without SI/SA to weigh more compared to infants born to mothers reporting no symptoms. Children born to mothers in the depressive symptoms without SI/SA group weighed an average of 166.7 grams more (98.3% CI = 38.8-372.2) than infants born to mothers reporting no symptoms. This trend was maintained after adjusting for covariates ($M = 136.9$ g, 98.3% CI = -26.6-300.3) (Table 4).

There was also no statistically significant difference in the gestational age of infants born to mothers reporting depressive symptoms versus those reporting no symptoms ($F[1,292] = 0.004$, $P = .950$). There was no statistically significant difference found on univariate and multivariate analysis of gestational age across the 3 groups. Analysis of maternal drug use and child maltreatment as risk factors was not significantly related to birth outcomes and depressive symptoms.

Discussion

This preliminary study extends the research on pregnancy and depressive symptoms to include an analysis of the association between self-reported depressive symptoms and birth outcomes in a large clinical cohort of pregnant adolescents. Few studies to date have focused solely on evaluating the association between symptoms of depression and birth outcomes in a population of pregnant adolescents. As hypothesized, the current study reports an association between having suicidal ideation and attempt history and lower infant birth weight. This study also documents the prevalence rate of self-reported depressive symptoms in this high-risk population of urban pregnant adolescents. This study cohort has a higher prevalence rate of

depressive symptoms compared with previous reports of nonpregnant adolescent females and pregnant adults (28%, 20%, and 17%, respectively).^{7,8}

The findings from this preliminary study suggest that there is an elevated risk of lower birth weight births among adolescent mothers who report depressive symptoms with SI/SA compared to adolescent mothers who report depressive symptoms without SI/SA. Primary mechanisms by which depressive symptoms might influence birth weight have been reported. First, depressed mood has been linked to hormonal changes in the body, such as elevations in catecholamine and cortisol levels. These neurochemicals influence placental function, uterine blood flow, and uterine irritability, which affect the growth and development of the fetus.^{3, 20} Second, studies have found that women with high levels of depressive symptoms are at increased risk of engaging in adverse health behaviors. For example, drug use, psychosocial stressors, and delayed or inadequate prenatal care are cited as important risk factors that influence birth weight and length of gestation.^{3,27} In the current study, drug use, frequency of prenatal visits, and child maltreatment were not significantly associated with differences in mean birth weight among the study groups. Thus, the findings from this study suggest that there may be an association between self-reported depressive symptoms with SI/SA history and delivering an infant of lower birth weight.

The association between LBW and the depressive symptoms with SI/SA group in this cohort is especially concerning, considering their participation in the TAPP program. The TAPP program provides integrated medical and psychosocial support services that are designed to meet the complex needs of pregnant adolescent mothers. Teen Alliance for Prepared Parenting program participants reporting depressive symptoms routinely receive referrals for community-based mental health services; however, many of the participants fail to consistently use these treatment services.

Adolescents can be difficult to engage in mental health treatment because of their attitudes and beliefs, immaturity, low self-esteem, and lack of resources.²⁸ Notably, none of the participants reported receiving mental health treatment at the time of their initial intake. Teen mothers may feel they do not need help or may be reluctant to discuss their symptoms with health care professionals. Studies have found that minority mothers are twice as likely not to seek help for their symptoms, compared with non-Hispanic white mothers. The social stigma associated with having a mental health problem and low acculturation may also influence treatment engagement and compliance. These factors have been found to be more severe in minority populations.⁴

Surprisingly, infants born to mothers reporting depressive symptoms without SI/SA weighed more than infants born to mothers reporting no depressive symptoms. Although the mean difference in infant birth weight across the 2 groups was not statistically significant, this unanticipated finding may be attributed to unreported depressive symptoms among the group reporting no depressive symptoms. These false negative responses may have spuriously lowered the mean birth weight among infants born to mothers in this group. This finding may explain the lack of statistically significant findings in the analysis of birth outcomes between the depressive symptoms with SI/SA and the no symptoms group. This finding supports the need for more standardized systematic assessment of depressive symptoms.

On average, infants born to adolescent mothers in this study were not in the LBW (<2500 g) range. Although teens reporting depressive symptoms with SI/SA delivered infants of lower birth weight compared to infants of teen mothers reporting depressive symptoms without SI/SA and no symptoms, the mean infant birth weight is above the clinical threshold for LBW. Comparative prospective studies examining depressive symptoms, compliance with medical

care, diet, and mental health services are necessary to determine the effects of intervention programs, such as TAPP, on birth outcomes.

The present study has several limitations. First, the study relied on data from a brief screening, self-report questionnaire. Self-report instruments are subject to bias and may not be as reliable as diagnostic interviews, standardized measures of specific mental health symptoms, and collateral information. Additionally, on initial interview, adolescents may be unlikely to admit or identify depressive symptoms, resulting in underreporting of symptoms. Self-report questionnaires, however, have been found to be sensitive to depressive symptoms.¹ Furthermore, 2-question, case-finding instruments, as well as single items from standard depression measures (eg, I feel sad), have been found to be useful in detecting depression in primary care settings.²⁹ Some studies have also found that suicidal patients are more likely to report current suicidal ideation on a self-report measure than in a clinical interview.³⁰ Second, the questionnaire was administered during the participants' initial prenatal visit. There was no re-administration of the questionnaire to evaluate depression symptoms during the course of pregnancy. This study's cross-sectional design does not capture the variability in rates of depressive symptoms that may occur during the course of the pregnancy or the compliance with and effects of mental health treatment. Previous studies have found rates of maternal depression to be more substantial during the second and third trimesters.¹ This result suggests that depression estimates reported in this study may be conservative, since symptoms were assessed only during the early stages of pregnancy. The study examined the records of African American and Latina adolescent mothers exclusively, because they accounted for the majority of patients enrolled in the teenage pregnancy program. These results may differ among other racial/ethnic groups.

Future studies should prospectively examine the effects of depressive symptoms and suicidal ideation, using standardized instruments in each trimester. Screening measures should elicit lifetime and recent symptoms. The role of protective factors such as supportive relationships, interventions, and self-esteem should also be analyzed. Multi-informant reports, including reports from clinicians, parents, and teachers, may be used to support the presence or absence of mental health symptoms. In addition, future research should include adolescent mothers of other sociodemographic and racial/ethnic backgrounds to determine differences in symptom prevalence and birth outcomes.

The results from this preliminary study have significant public health implications for adolescent mothers. Many teenage mothers do not consistently access health care resources, and therefore, depression and other mental health problems may go unrecognized. Because adolescent mothers often have a history of trauma, lack sufficient social support and economic resources, and have an increased risk for depression,^{4,9,19,23,31} they should receive routine screening for depressive symptoms and other mental health disorders throughout their pregnancy and postpartum period. Early identification of depressive symptoms and effective mental health treatment may improve birth outcomes among this underserved population.

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Table 1

Study Cohort Demographics (N = 294)

Maternal Characteristics	16.2 (1.4)	
Age (y) (mean [SD])	n	%
African-American	224	76
Latina	70	24
Primigravadas	272	93
<15 years old	84	29
>15 years old	210	71

Abbreviation: SD, standard deviation.

Table 2

Depressive Symptom Prevalence of Study Cohort (N = 294)

Group	n	%
Depressive symptoms without SI/SA total	49	17
Depressive symptoms with SI/SA total	32	11
Any reported depressive symptoms total	81	28
African American		
Depressive symptoms without SI/SA total	39	17.4
Depressive symptoms with SI/SA total	21	9.4
Any reported depressive symptoms total	60	27
Latina		
Depressive symptoms without SI/SA total	10	14
Depressive symptoms with SI/SA total	11	16
Any reported depressive symptoms total	21	30
Under age 15		
Depressive symptoms without SI/SA total	16	19
Depressive symptoms with SI/SA total	9	11
Any reported depressive symptoms total	25	30
Over age 15		
Depressive symptoms without SI/SA total	33	16
Depressive symptoms with SI/SA total	23	11
Any reported depressive symptoms total	56	27

Abbreviation: SI/SA, suicidal ideation or attempt.

Table 3

Birth Outcomes of Study Cohort (N = 294)

Variable	Range	Mean	SD
Gestational age (wks)	27–43	39	2
Birth weight (g)	964–4318	3081	544

Table 4

Regression Analysis of Depressive Symptom Status and Infant Birth Weight (N = 294) Adjusted for Age, Completed Prenatal Appointments, and Gestational Age

Group Comparison	Difference (g)	95 % CI	Significance
Any reported symptoms vs no reported symptoms	42.3	−68.8 to 153.4	NS
Symptoms without SI/SA vs no symptoms	136.9	−26.6 to 300.3 ^a	NS
Symptoms with SI/SA vs no symptoms	−102.6	−298.5 to 93.3 ^a	NS
Symptoms with SI/SA vs symptoms without SI/SA	−239.5	−475.1 to −3.9 ^a	P = 0.016

Abbreviations: CI, confidence interval; NS, not significant; SI/SA, suicidal ideation or attempt.

^aConfidence intervals for pairwise comparisons of no symptoms, symptoms with SI/SA, and symptoms without SI/SA groups using the conservative Bonferroni correction, $(1-0.05/3)*100\%$ CI.