

Prenatal and Parenting Stress on Adolescent Maternal Adjustment: Identifying a High-Risk Subgroup

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Abstract *Objectives:* Identifying adolescents who are at increased risk for a particularly difficult pregnancy and adjustment into parenthood is important, as the physical and psychological development of their infants rest in the well-being of these new mothers. This study aims to examine the effects of prenatal stress and parenting stress and the association with: (1) adolescent maternal adjustment; and (2) postpartum emotional distress. *Methods:* In a prospective longitudinal cohort study, 154 pregnant adolescents (age 14–19) from 10 public clinics were interviewed four times from the third trimester of pregnancy to 16 months postpartum. Planned comparisons of four stress groups were used to compare mean scores for measures of feelings about motherhood, infant care, parenting competency, and emotional distress. *Results:* Adolescent mothers who experienced high prenatal stress and high parenting stress had lower maternal

adjustment (i.e., fewer positive feelings about motherhood, less infant care, and low parenting competency) and high postpartum emotional distress. Even when compared to adolescent mothers who experienced prenatal or parenting stress only, these adolescents were still at a greater disadvantage. *Conclusions:* Results suggest that adolescents who experience high stress during and after pregnancy are at increased risk for difficult maternal adjustment and high postpartum emotional distress. Findings support the need for health services targeting this subgroup of adolescent mothers, including both prenatal and parenting support. Early intervention to increase maternal adjustment and decrease emotional distress should remain a priority in facilitating the most optimal maternal and child health outcomes.

Keywords Adolescents · Pregnancy · Stress · Maternal adjustment

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Maternal adjustment may be particularly difficult for adolescents who are less prepared for the challenges of parenthood. Adjustment into the new role of being a mother is important because of its influence on the mother-infant relationship and on the emotional development of the infant [1]. Emotion and parenting (e.g. sense of competency and satisfaction with sharing baby-care tasks) have been studied as part of the maternal adjustment period and have shown evidence for improvement in mothers at risk for postnatal distress [2]. While many studies on adolescent pregnancy focus on the psychological or social issues surrounding pregnancy, fewer studies address maternal adjustment and subsequent emotional distress using a prospective longitudinal design. Young mothers who have adjustment problems have a more difficult time dealing with the demands of parenthood and to the needs of their children while attempting to address their own personal needs [3]. There is considerable variability in

adolescent parent-child functioning, and many adolescent mothers are successful at adjusting into parenthood [4]. However, adolescent mothers display more unrealistic expectations of child development, increased parenting problems, and higher rates of maltreatment [5]. They are also less responsive and less sensitive in interactions with their infants compared to adult mothers [3]. Socioeconomic status, mother-daughter relationship, and perceived partner support during pregnancy, along with accumulated stressors during parenthood among adolescent mothers have been associated with difficult maternal adjustment [6].

For new mothers, stress is a common response to increasing physiological and psychological challenges, including worries about parenting, fatigue/exhaustion, changes in relationships, and financial strain. Increased stress adversely affects the quality and experience of pregnancy, as well as maternal and infant outcomes [7]. During pregnancy, stress has been linked to physical and behavioral infant outcomes such as preterm delivery, short gestational age, difficult infant temperament, and delays in cognitive development [8–10]. Postpartum stress can compromise the mother-infant relationship [11]. Other factors that predict the quality of mother-infant relationships and maternal adjustment include prenatal attachment in the last trimester and maternal postpartum behaviors such as close contact and positive attitude [12, 13].

While the associations between prenatal stress, postpartum stress, and maternal adjustment have been explored primarily in adult mothers, few studies have examined the effects of stress during and after pregnancy among adolescent mothers. There has been support for the link between prenatal adjustment and adolescent parenting stress [3]. Increased stress only during parenthood may reflect a normal course of adjustment to the responsibilities of parenting; however those who experience low stress during parenthood may present increased likelihood for optimal maternal adjustment. Many studies of stress and pregnancy have used cross-sectional designs, however comparisons of the effects of continuous stress across time points during and after pregnancy is lacking [14].

For the estimated 425,000 live births each year from adolescent mothers, it is important to identify adolescents who are at risk for a particularly difficult pregnancy and parenthood [15]. The physical and psychological development of their infants rest in the well-being of these new mothers and the mother-infant relationship they are able to provide. Accordingly, the objectives of this study were to examine the effects of prenatal stress and parenting stress and the association with: (1) adolescent maternal adjustment (i.e., feelings about motherhood, infant care, and parenting competency); and (2) emotional distress after delivery and 16 months postpartum. It was hypothesized that adolescent mothers who experience both high prenatal stress and high parenting stress

will experience low maternal adjustment and high emotional distress, followed by adolescents who experience high prenatal stress only, those who experience parenting stress only and lastly, the most favorable outcomes will be for adolescent mothers who experience low prenatal and low parenting stress.

Methods

Participants

Participants included pregnant and/or parenting adolescent girls taking part in a prospective study on HIV/STD-risk behavior [16, 17]. Adolescents were recruited between June 1998 and March 2000 from 10 hospital clinics, community health care centers, and high school clinics in New Haven, Bridgeport, and Hartford, Connecticut. These clinics provided gynecological and obstetrical services in low-income, predominantly minority communities. Adolescents were recruited to the study by a referral from a health care provider, contact with an interviewer at participating clinics, a referral from a study participant, or advertising materials. Eligibility included adolescent females between 14 and 19 years old, being pregnant, and nulliparous (never given birth). The current analysis utilized data from pregnant participants.¹ Of the 203 pregnant adolescents completing a baseline interview, 154 completed post-pregnancy interviews approximately four months postpartum (76%). The final sample for this analysis included only pregnant adolescents who completed both the baseline and the 4-month post-pregnancy interviews which assessed maternal adjustment (i.e., infant care, feelings about motherhood, parenting competency) and emotional distress.

Procedures

Participants completed four 90-minute face-to-face interviews over the course of 18 months. The baseline interview took place when the pregnant adolescents were in the third trimester of pregnancy. Follow-up interviews were completed every 6 months thereafter. Participation was completely voluntary, confidential, and informed consent was obtained from all study participants. Participants were paid \$25 for each interview. Parental consent was not obtained because state statutes allow adolescents seeking reproductive health care to independently consent to related research. This study was approved by Yale University's Human Investigation Committee and by Institutional Review Boards at study clinics.

¹ Original study included both pregnant and non-pregnant adolescents.

Measures

Prenatal stress and parenting stress groups

During pregnancy, *prenatal stress* was measured with the 10-item Perceived Stress Scale ($\alpha = .80$) [18]. Participants rated how they felt on a 5-point likert-type scale (1, never to 5, very often). Questions included feeling: “upset by something that happened unexpectedly” and “nervous or stressed.” Scores were averaged to create an overall measure of prenatal stress, where high scores equated to higher levels of stress.

At four months postpartum, *parenting stress* was measured with the 18-item short form Parenting Stress Index ($\alpha = 0.84$) [19]. Respondents rated statements from 1 (strongly disagree) to 5 (strongly agree) on statements such as, “I feel trapped in my responsibilities as a parent” and “When I do things for my child he/she doesn’t seem to appreciate it.” Scores were averaged to create an overall measure of parenting stress. Higher scores reflected higher levels of stress.

Stress groups were created based on the dichotomized mean split of the Perceived Stress Scale and Parenting Stress Index. The resulting four groups were: (1) low prenatal stress and low parenting stress, (2) high parenting stress only, (3) high prenatal stress only, and (4) high prenatal stress and high parenting stress. The average score for prenatal perceived stress was 2.85 and the average score for parenting stress was 2.28 (out of 5). Fifty percent of adolescents reported above average prenatal perceived stress (baseline) and 58% reported above average parenting stress (four months postpartum).

Maternal adjustment

At 4 months postpartum (time 2), adolescents were asked about their *feeling towards motherhood*. Respondents rated a list of emotional words (e.g., angry, bad, pleased, proud) from 1 (strongly disagree) to 7 (strongly agree). Positive feelings (13 items) were averaged and analyzed ($\alpha = 0.80$). *Infant care* was assessed using a 4-point scale ranging from 0 (never) to 4 (always) for statements regarding how much time the mother did certain things for the baby. There were a total of 8 items ($\alpha = 0.80$). Sample statements include: “You feed the baby” and “You get the baby to sleep.”

Parenting competency was assessed from a subscale of the Revised Parenting Sense of Competence Scale (PSCS) [20]. The subscale was created based on factor analysis which revealed one prominent factor, explaining 31% of the total variance. Respondents rated statements from 1 (strongly disagree) to 5 (strongly agree) on statements such as, “You understand how to take care of a baby,” “You like being a

mother,” and “You are living up to your own expectations as a mother.” Scores were averaged to create an overall measure of parenting competency. There were a total of 10 items ($\alpha = 0.72$).

Emotional distress

Emotional distress was assessed using the Brief Symptom Inventory (BSI) [21]. The BSI is a widely used self-report symptom inventory designed to assess psychological symptom patterns in psychiatric, medical, and community populations. Respondents rate the frequency of symptoms on a 5-point scale ranging from 1 (not at all) to 5 (a lot). The scale includes three dimensions/subscales of depression, anxiety, and hostility, which can be used to define clinically significant symptom levels [21]. Scores were summed as an indicator of global emotional distress. There were a total of 18 items ($\alpha = 0.90$).

Data analytic plan

Simple summary statistics were used to describe the study population. Chi-squares were computed to test for group differences. Through a series of one-way Analysis of Variance (ANOVA), planned comparisons were used to compare mean scores for measures of feelings about motherhood, infant care, parenting competency, and emotional distress. Because the objective is to examine effects of prenatal and parenting stress, these analyses will focus on comparing high prenatal and high parenting stress to the other three stress groups previously described.

Results

For the 154 pregnant adolescents included in this analysis, the average age was 17.4 ($SD = 1.5$), ranging from 14 to 19 years old. Forty-three percent were African American, 37% were Latina, 10% were White, and 10% indicated mixed or other racial/ethnic backgrounds. Twenty percent of the adolescents reported receiving financial assistance from the government and 79% were currently in high school. When information on maternal adjustment and emotional distress was collected, the average infant age was 4.1 months ($SD = 1.5$). Compared with adolescents who were not included in the analyses (i.e., no postpartum data), those who provided both baseline and postpartum data did not differ with regards to age, education, race/ethnic background, or prenatal perceived stress. However, adolescents who did not provide postpartum data were more likely to have more positive feeling about motherhood at baseline ($p < 0.05$).

Prenatal and parenting stress combination

The objectives of this study were to examine the effects of prenatal stress and parenting stress and the association with adolescent maternal adjustment and emotional distress. Four stress groups were created: (1) high prenatal stress and high parenting stress ($n = 40$, 26%), (2) high prenatal stress only ($n = 37$, 24%), (3) high parenting stress only ($n = 29$, 19%), and (4) low prenatal stress and low parenting stress ($n = 48$, 31%). Table 1 describes the demographics for each group. In a series of planned comparisons using one-way ANOVAs, significant differences were observed for infant care, feelings about motherhood, parenting sense of competency, and emotional distress. Average scale scores for these measures generally followed the hypothesized directional effect as seen in Table 2 and Fig. 1.

Maternal adjustment

Adolescents who experienced both high prenatal stress and high parenting stress reported significantly fewer positive feelings about motherhood and fewer infant care activities (e.g., feeding, bathing, and putting the baby to sleep) compared to the other three stress groups ($p < 0.05$). Adolescent mothers who experienced low prenatal and low parenting stress reported the highest levels of infant care and positive feelings.

Adolescents in the high prenatal stress and high parenting stress group had the lowest scores on the Parenting Sense of Competency Scale (PSCS) and were significantly different from the high prenatal only and low prenatal and low parenting stress groups ($p < 0.05$). Adolescents who experienced low prenatal stress and low parenting stress scored the highest on parenting competency.

Emotional distress

At four months postpartum, adolescents in the high prenatal stress and high parenting stress group experienced the most emotional distress. This group was significantly different from the low prenatal and low parenting stress group and the high parenting stress only group ($p < 0.05$). There was no difference compared to the high prenatal stress only group. Still, the high prenatal and high parenting stress group had a higher total BSI score ($M = 21.6$ compared to 15.9).

At time 4, approximately 16 months postpartum, the same direction for total BSI persisted from high prenatal and high parenting stress, high prenatal stress only, high parenting stress only, to low prenatal and low parenting stress. However, the only significance difference that remained was between the high prenatal and high parenting stress group and the low prenatal and low parenting stress group ($p < 0.05$). *P*-values for the other comparisons were marginal for high

Table 1 Demographic characteristics for pregnant/parenting adolescents by stress group*

| Characteristic | High prenatal & parenting stress N (%) | High prenatal stress only N (%) | High parenting stress only N (%) | Low prenatal & parenting stress N (%) | <i>p</i> ^a |
|--------------------|--|---------------------------------|----------------------------------|---------------------------------------|-----------------------|
| Age (mean yrs, SD) | 17.2 (1.6) | 17.8 (1.5) | 16.8 (1.5) | 17.6 (1.3) | 0.18 |
| Education | | | | | 0.44 |
| In high school | 28 (70.0%) | 29 (78.4%) | 24 (82.8%) | 40 (83.3%) | |
| Not in HS | 12 (30.0%) | 8 (21.6%) | 5 (17.2%) | 8 (16.7%) | |
| Race | | | | | 0.64 |
| White | 4 (10.0%) | 4 (10.8%) | 2 (6.9%) | 5 (10.4%) | |
| African American | 19 (47.5%) | 16 (43.2%) | 8 (27.6%) | 23 (47.9%) | |
| Latina | 13 (32.5%) | 13 (35.1%) | 17 (58.6%) | 15 (31.3%) | |
| Other/Mixed | 4 (10.0%) | 4 (10.8%) | 2 (6.9%) | 5 (10.4%) | |
| Public Assistance | | | | | 0.46 |
| Yes | 10 (25.0%) | 7 (18.9%) | 3 (10.3%) | 11 (22.9%) | |
| No | 30 (75.0%) | 30 (81.1%) | 26 (89.7%) | 37 (77.1%) | |

**p*-values are from chi-square statistics testing for group differences.

Table 2 Planned comparisons (ANOVAs): mean scores across stress groups

| | High parental & parenting stress | High parental stress only | High parenting stress only | Low parental & parenting stress |
|----------------------------|----------------------------------|---------------------------|----------------------------|---------------------------------|
| Maternal adjustment | | | | |
| Positive feelings | 5.50 (ref) | 6.00* | 5.95* | 6.16* |
| Infant care | 3.27 (ref) | 3.66* | 3.70* | 3.61* |
| Parenting competency | 4.06 (ref) | 4.43* | 4.29 | 4.59* |
| Emotional distress | | | | |
| 4 months postpartum | 21.58 (ref) | 15.95 | 13.52* | 6.83* |
| 16 months postpartum | 22.14 (ref) | 15.53 | 14.35 | 7.51* |

*Indicates significant difference at $p < 0.05$ level compared to the high prenatal & parenting stress group.

prenatal and high parenting stress compared to the other two groups. Figure 1 demonstrates the hypothesized directional effects for the average BSI scale scores (i.e., emotional distress) by stress group at both 4 and 16 months postpartum.

Discussion

Adolescent mothers who experienced both high prenatal stress and high parenting stress were more likely to experience low maternal adjustment and high, early and late postpartum emotional distress. Even when compared to adolescent mothers who experienced stress at some point during pregnancy or parenting (i.e., high prenatal stress only or high parenting stress only), these adolescents were still at a greater disadvantage, thus reflecting the effects of continuous stress across pregnancy and parenthood. These analyses build upon prior literature on stress and pregnancy/parenting and the gap in knowledge of how the effects of stress at different time points during and after pregnancy influence subsequent maternal adjustment and emotional distress in adolescent mothers [8, 14, 22].

The adolescent mothers who experienced stress during the pre- and post-partum periods report fewer positive feelings about motherhood. Those who reported low stress before and after the birth of their infants had the most positive feelings about motherhood. Maternal attitude has been linked as an independent predictor of child behavior [23], and thus is an important marker for suboptimal maternal adjustment and child behavior.

Compared with the other three stress groups, adolescent mothers who experienced high prenatal stress and high parenting stress spent less time caring for their infant (e.g., feeding, bathing, and putting the baby to sleep). In contrast, mothers who experienced low prenatal and low parenting stress spent the most time caring for their infants. Postpartum behaviors are important in establishing healthy maternal-infant relationships and can predict the quality of the relationship during the first year of life [13]. Here, the accumulation of prenatal and parenting stress appears to negatively influence the amount of time spent on infant care activities for adolescent mothers, as evidenced by more time spent on infant care even for the discordant stress

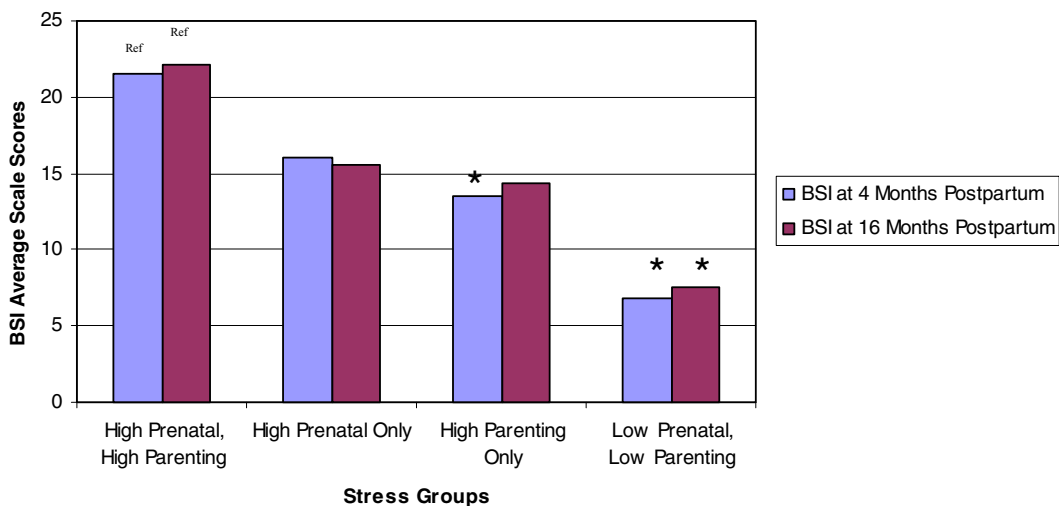


Fig. 1 Average BSI scale scores (emotional distress) by stress group. (*) Indicates significant difference at $p < 0.05$ level compared to the high prenatal & parenting stress group

groups (i.e., high prenatal stress only or high parenting stress only).

Adolescent mothers in the high prenatal stress and high parenting stress group felt the least competent overall with regards to parenting. Adolescents who reported low prenatal and low parenting stress felt the most competent. Although participants who experienced stress both pre- and post-natally were not statistically different from those who experience high stress once they were parenting, the latter group did report feeling more competent about their parenting. Infant care and parenting competency were positively correlated and are likely to influence one another. More infant care could increase a mother's sense of parenting competency, just as feeling confident about parenting can influence the amount of time spent taking care of the infant instead of asking for assistance. Given that infant care was significantly different between all groups, the mechanisms by which stress interacts with parenting competency likely originates from the amount of time mothers spend caring for their infant. Adolescent mothers who experienced high prenatal and high parenting stress may have had situations in their lives that did not allow for increased time for infant care, thereby resulting in low parenting competency.

Emotional distress in the early postpartum period (4 months) was highest for adolescent mothers who experienced high prenatal and high parenting stress. This effect was still apparent at late postpartum (16 months). At four months postpartum, there was a significant difference between participants who experienced both high prenatal and parenting stress and high parenting stress only, which suggests that low prenatal stress may be a protective factor for postpartum emotional distress. Conversely, the lack of a significant difference between high prenatal stress only and high prenatal and high parenting stress may suggest that high prenatal stress increases the likelihood of emotional distress, even if parenting stress is low. At 16 months postpartum, the high prenatal and high parenting stress group was only statistically different from the low prenatal and low parenting stress group, though the expected direction of average scores was maintained.

The physical and psychological health of a child highly depends on the mental health of the mother, both in the short and long term [22, 24]. Experiencing prenatal stress can affect newborn physiology; nevertheless, experiencing continuous stress across pregnancy and parenthood (i.e., measured by depressive symptoms) has been shown to heighten adverse infant outcomes [22]. Increased parenting stress and low parenting competency are important factors associated with maternal emotional distress [25]. Adverse outcomes for children of highly distressed mothers include delays in socio-emotional and cognitive development [26]. This is especially concerning for children of adolescent mothers who are already at higher risk for these same delays [6]. Reduc-

ing parenting stress has implications for reduced emotional distress [2], and in turn, improved infant outcomes.

A limitation to the current analyses is the type of stress measurement used pre-and post-natally. While the post-natal measure is specific to parenting, the prenatal measure of stress is general and it is unknown how this may have impacted the grouping. Another limitation is the use of self-reported data with regards to stress, which may be influenced by social desirability since adolescents may be reluctant to report, for example, high parenting stress. Future studies may wish to add observational and/or biological assessments to complement self report such as measures of the neuroendocrine cortisol, a commonly used indicator of stress. Additionally, participation bias could affect the generalizability of the results. Adolescent mothers who did not complete both baseline and post-pregnancy (4 months postpartum) interviews tended to have more positive feelings about motherhood. Lastly, though the initial sample size was large, the use of planned comparisons and creation of subgroups made sample sizes for each group relatively small. Nevertheless, there are several strengths of the analyses worth mentioning. First, few studies have examined stress and pregnancy/parenting in adolescent mothers using a prospective longitudinal design. Second, in analyzing the effects of stress across several time points, the analyses was able to provide a unique insight into the consequences of accumulated prenatal and parenting stress. This information is important in identifying a subset of adolescent mothers who may be at increased risk for a particularly challenging pregnancy and parenthood.

Adolescent mothers are already at risk for suboptimal maternal adjustment and their children are more likely to experience socio-emotional and cognitive delays. While some adolescents are able to adjust to the challenges of parenting, the opportunity to identify a high-risk subgroup has implications for the short and long term well-being of mother and child. Stress-reducing interventions with young mothers identified during pregnancy as having increased stress might forestall parenting problems [3] and subsequent maternal adjustment difficulties that arise during early child rearing.

Several adolescent parenting programs have proven successful in positively influencing maternal health and infant outcomes [27–29]. Both school-based and mentorship/case management programs can impact repeat pregnancy, parenting skills, and incidence of low birthweight infants [27, 28]. In considering the potential contextual factors (e.g., family/partner involvement and neighborhood safety) involved in a mother's pregnancy experience, personalized mentorship which provides social and emotional support can be an important element of interventions targeting high-risk adolescents. One such intervention focused on mentorship reported improvements in health practices, parenting skills, and infant outcomes among low-income pregnant and parenting adolescent mothers [27]. There is also evidence that

adolescents who enter parenting programs during pregnancy experience greater benefits than adolescents who are already parenting [29].

In sum, our results suggest that adolescents who experience both high prenatal stress and high parenting stress are at increased risk for difficult maternal adjustment and high, early and late postpartum emotional distress. Health care services should target this subgroup of adolescent mothers, including both prenatal and parenting support. Implications from this study suggest that measures should be developed in order to screen for and identify high-risk adolescent mothers and increase efforts for enrolling mothers in parenting programs during pregnancy. The physical and psychological development of their infants rests in the well-being of these new mothers. Improving mother-child relationships through increased maternal adjustment and reduced distress should remain a priority in facilitating the most optimal maternal and child health outcomes.

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