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Research report

Stability of maternal depressive symptoms among urban, low-income, African American adolescent mothers

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ABSTRACT

Background: Maternal depressive symptomatology is an important public health issue with negative consequences for both mothers and infants.
Methods: This study examined prevalence and patterns of depressive symptoms among 181 urban, low-income, first-time, African American adolescent mothers recruited from urban hospitals following delivery. Follow-up evaluations were conducted at 6 ($N = 148$; 82%) and 24 ($N = 147$; 81%) month home visits. Depressive symptoms were measured with Beck Depression Inventory (BDI).
Results: Half of mothers (49%) had BDI scores >9 at baseline, with significant correlations between BDI scores across all visits ($r = 0.28$–0.50). Depressive symptom trajectories analyzed using group-based trajectory modeling revealed three trajectories of depressive symptoms: Low (41%), Medium (45%), and High (14%). The high depressive symptom group reported lower self-esteem, more negative life events, and lower parenting satisfaction than the low and moderate depressive symptoms groups.
Limitations: Depressive symptoms were self-reported and not verified with a clinical interview. Findings are limited to urban, low-income, African American adolescent mothers and may not be generalizable to other populations.
Conclusions: The high prevalence and relative stability of depressive symptoms through 2 years of parenting suggest the need for early identification and treatment of maternal depressive symptoms. Brief screening for maternal depressive symptoms conducted during pediatric well-child visits is a feasible and effective method for identifying mothers with depressive symptoms, however, screening measures can not differentiate between high and low levels of depressive symptoms. Brief intervention may be an effective treatment for mothers with mild symptoms of depression; mothers with moderate to severe symptoms may require more intensive intervention.
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1. Introduction

Maternal depressive symptomatology is an important public health issue with negative consequences for both mothers and infants (Beardslee et al., 1983; Boyce and Stubbs, 1994; Gelfand and Teti, 1990; Moore et al., 2001). Postpartum depression is reported to occur in 10% to 15% of mothers in the general population (O'Hara and Swain, 1996) and 35% to 67% of low-income mothers, particularly those who are single, young, and poorly educated (Beck, 2001; Beeghly et al., 2003; Boury et al., 2004; Coiro, 2001; Colletta, 1983; McLennan et al., 2001; Seguin et al., 1999; Walker et al., 2002). Information regarding the persistence and severity of maternal depressive symptoms is limited. With the exception of a 16-year follow-up among British women (Pawlby et al., 2009), few studies have followed women beyond the first year of parenting (Beeghly et al., 2003; Beeghly et al., 2002; Tomlinson et al., 2005) and most have

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focused on middle-class, well-educated, non-Hispanic white adult mothers (Beeghly et al., 2002; Campbell and Cohn, 1997; Cooper et al., 1988; NICHD Early Child Care Research Network, 1999).

Adolescent mothers may be at high risk for postpartum depressive symptoms because depressive symptoms are prevalent among adolescents in general (Essau et al., 2000; Kashani et al., 1987), with prevalence ranging from 15% to 20% (Lewinsohn et al., 2000). In comparison with male adolescents, females are 2 to 3 times more likely to have at least one episode of depression (Essau et al., 2000; Wickramaratne and Weissman, 1998) and their symptoms are often more severe (Reinherz et al., 1993). Depressive symptoms during adolescence are often stable and may continue into adulthood (Lewinsohn et al., 2003).

The prevalence of postpartum depression among adolescent mothers has been estimated to be between 6% and 36% (Barnet et al., 1996; Birkeland et al. 2005; Deal and Holt, 1998; Figueiredo et al., 2007; Schmidt et al., 2006; Troutman and Cutrona, 1990). In comparison to adult mothers, adolescent mothers have a higher prevalence of postpartum depression (Deal and Holt, 1998; Reis, 1988; Figueiredo et al., 2007) and are more likely to have depressive symptoms later in adulthood (Deal and Holt, 1998; Horwitz et al., 1996). Hammen (1991) has described a multifactorial transactional model of adolescent depression that includes not only biological predisposition, but also contextual factors such as negative family experiences and stress. The variability in the prevalence of depression may be partially explained by race/ethnic differences, although there is inconsistency in the findings. Deal and Holt (1998) found that African American adolescent mothers were more likely to report depressive symptoms than non-Hispanic White adolescent mothers; whereas Schmidt and colleagues (2006) found that African American mothers were less likely to report depressive symptoms than Mexican-American or Caucasian mothers over the first 2 years of parenting.

Several cross-sectional studies have found that depressive symptoms are more common among African American adolescents compared to non-Hispanic White adolescents (Fleming and Offord, 1990; Roberts and Sobhan, 1992). In a longitudinal investigation of depressive symptoms among low-income African American adolescents, Repetto and colleagues (Repetto et al., 2004) describe four distinctive trajectories of depressive symptoms (i.e., consistently high, consistently low, increasing, decreasing) from 14 to 17 years of age. These patterns are consistent with patterns described among non-Hispanic White adolescents (Dubois et al., 1995). Adolescents in the consistently high trajectory pattern were more likely to be females, to report symptoms of anxiety and stress, and to have low scores on self-esteem and school performance, compared to adolescents in the other trajectories (Repetto et al., 2004).

At least five studies have examined the persistence of maternal depression beyond the immediate postpartum period (Beeghly et al., 2003; Beeghly et al., 2002; Mora et al., 2009; Pawlby et al., 2009; Schmidt et al., 2006). Among non-Hispanic White, first-time middle-class adult mothers, 46% reported postpartum depressive symptoms (Beeghly et al., 2002). Although the prevalence of depressive symptoms decreased at 3, 6, and 12 months postpartum, mothers who had experienced multiple depressive symptoms after the birth of their baby were likely to continue to report depressive symptoms throughout the first year postpartum (Beeghly et al., 2002). In a largely African American sample of women recruited during pregnancy and followed through 26 months postpartum, five trajectories of depressive symptomatology were found (Mora et al., 2009). Most of the sample had stable trajectories: either never depressed (71%) or chronic high depression (7%). A small number of mothers had less stable trajectories: antepartum only (6%), postpartum only (9%), or late (e.g., increasing after 12 months, 7%). Among first-time African American adult mothers, 8% to 18% reported postpartum depressive symptoms shortly after delivery (Beeghly et al., 2003). Over one-third who reported depressive symptoms at 2-months postpartum went on to report depressive symptoms at a subsequent visit when depressive symptoms were measured at 3, 6, 12 and 18 months postpartum.

In a sample of 127 women followed from pregnancy through their child's 16th year, 64% had at least one depressive episode (Pawlby et al., 2009). The incidence of depression was highest during pregnancy (33%), and most women (90%) who met ICD-9 diagnostic criteria for depression during pregnancy had at least one additional depressive episode. In a longitudinal investigation of an ethnically diverse sample of adolescent mothers, self-reported depressive symptoms were obtained at 3, 12, 24 and 48 months postpartum (Schmidt et al., 2006). Over 80% of mothers who reported depressive symptoms at 3 months reported depressive symptoms at two or more visits. To our knowledge, this is the only longitudinal investigation of depressive symptoms among adolescent mothers. Taken together, these five studies suggest that although depressive symptoms abate somewhat over time, mothers who report depressive symptoms shortly after delivery are at risk for ongoing symptoms of depression.

In the present study, we add to the current literature by examining the prevalence of depressive symptoms and their trajectories over 24 months postpartum among African American first-time adolescent mothers in an urban community. We tested three hypotheses. First, we hypothesized that the prevalence of depressive symptoms in this sample of adolescent mothers would be high immediately postpartum and would decrease over the next 24 months. Second, we hypothesized that adolescent mothers would report distinct trajectories of depressive symptoms over time. Finally, we hypothesized that adolescent mothers who clustered into a high depressive symptom trajectory would have lower scores on measures shown to correlate with depressive symptoms, including self-esteem, negative life events, and parenting satisfaction, than other adolescent mothers.

2. Methods

2.1. Study participants

Study participants included adolescent mothers enrolled in a longitudinal randomized controlled trial of a home intervention designed to promote parenting and adolescent development among low-income families (Black et al., 2006). Eligibility for mothers included age less than 18 years at delivery, first-time delivery, African American, low-income (defined as eligible for WIC — family income under 185% of poverty level), and no chronic physical illnesses that would interfere with parenting or adolescent development. Because national policies require that eligibility for public services be

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restricted to adolescent mothers who are in the guardianship of an adult (U.S. House of Representatives, 1996), we limited our sample to adolescent mothers who were living with their mother (grandmother of the baby). Eligibility for infants included full-term (≥37 weeks), birth weight greater than 2500 grams, and no congenital problems or chronic illnesses.

Approximately 83% (181/219) of eligible mothers agreed to participate and completed the baseline evaluation. There were no differences in maternal age or education between those who completed the baseline evaluation and those who did not. Follow-up evaluations were conducted when infants were 6 and 24 months of age. Study participation rates varied at each time point. One hundred and eighty one (100%) adolescent mothers participated in the baseline evaluation, 148 (82%) participated at 6 months postpartum, and 147 (81%) participated at 24 months postpartum. Most adolescent mothers (70%, $N=127$) participated in all three assessments. Twenty three percent of the sample participated in two assessments, either baseline and 6 months ($N=21$) or baseline and 24 months ($N=20$). Seven percent ($N=13$) of the sample participated in the baseline assessment only. Baseline Beck Depression Inventory scores did not differ by attrition status ($F(3, 177)=0.39$, $p>0.70$).

2.2. Procedures

Mothers were recruited from three urban hospitals in Baltimore, Maryland. The Institutional Review Boards at the University of Maryland School of Medicine and all three hospitals approved the study. Mothers were approached shortly after delivery and given a brochure explaining the study. Those who expressed interest in enrolling in the study completed consent forms and were scheduled to receive a baseline home evaluation within 3 weeks. Additional evaluations were conducted in the families' homes when infants were 6 and 24 months. At each evaluation, mothers completed standardized questionnaires on family demographics, personal health and mental health, access to services, and early adjustment to parenting. Questionnaires were administered via a laptop computer; questions were presented aurally through headphones and visually on screen, and responses were selected with a mouse. Mothers were paid $25 for each evaluation.

2.3. Measures

2.3.1. Maternal depression

Depressive symptoms were measured with the Beck Depression Inventory (BDI), a 21-item scale that is widely used to characterize depressive symptoms among adolescents and adults (Beck et al., 1961). The BDI measures various symptoms of depression with graded responses reflecting severity of symptoms, numerically coded from 0 to 3. Total scores are created as Likert-type, summed scales, therefore the theoretical minimum is 0 (21×0) and theoretical maximum is 63 (21×3). Higher scores reflect more depressive symptoms. The internal consistency of the scale for our sample was high, Cronbach's $\alpha=0.98$. Scores at each time point were evaluated both continuously and categorically. Consistent with clinical guidelines and protocols used with adolescents (Field et al., 1990; Kaplan et al., 1984; Panzarine et al., 1995), mothers were classified as non-depressed if their scores ranged from 0 to 9 and at risk for depression if their scores were greater than 9.

2.3.2. Self-esteem

Self-esteem was measured at 24 months by the Rosenberg Self-Esteem Scale (Rosenberg, 1965). This 10-item questionnaire uses a Likert Scale, ranging from 1 (strongly agree) to 4 (strongly disagree); high scores represent high levels of self-esteem. The scale was constructed for use with adolescents and has high internal consistency (coefficient alphas of 0.77 − 0.88) and test-retest reliability ($r=0.82$ − 0.85) (Blascovich and Tomaka, 1991). Cronbach's alpha for the self-esteem scale at 24 months was 0.86.

2.3.3. Life events

The Life Experiences Survey was administered at 24 months postpartum (Sarason et al., 1978). This 30-item scale was adapted from the original events scale by removing or altering items that did not apply to adolescent mothers. The scale included both positive and negative life events. If a respondent indicated that a life event had occurred, she was asked to rate the impact of the event on a 5-point scale ranging from 1 (extremely good) to 5 (extremely bad). An overall rank sum score of life events that combined events and event-impacts was used, with low scores indicating positive life events and high scores indicating negative life events. Cronbach's alpha for this measure was 0.64.

2.3.4. Parenting satisfaction

Parenting Satisfaction was measured with a subscale of the Parenting Sense of Competence Scale at 24 months (Johnston and Mash, 1989). The seven items in the parenting satisfaction scale are scored from 1 (strongly agree) to 6 (strongly disagree); high scores represent high parenting satisfaction. Cronbach's alpha for the Parenting Satisfaction scale at 24 months was 0.75.

2.4. Data analysis

Baseline demographic characteristics of the sample were examined using descriptive univariate statistics. The means and standard deviations of the Beck Depression Inventory (BDI) scores were computed, as well as the percent of adolescent mothers falling above the clinical cutoff score of 9 for each of the time points.

Group-based trajectories of depressive symptoms for adolescent mothers were estimated to examine the pattern of depressive symptoms over time. The trajectories were analyzed using group-based modeling with PROC TRAJ (Jones et al., 2001; Nagin, 1999; 2005). This method fits a group-based model to longitudinal data to determine whether there are distinct clusters of individuals that follow similar patterns over time. Like hierarchical and latent curve modeling, this semiparametric, group-based method uses a polynomial function to model the association between age at assessment and depressive symptoms (Nagin, 1999; 2005). Intervention group was not associated with depressive symptoms at any time point, and participants were collapsed across treatment and control groups as a result.

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To examine whether the clustering of adolescent mothers into trajectories based on depressive scores differed in other measures that are related to depressive symptoms, we used analysis of variance, followed by pairwise comparisons. Trajectory membership served as the independent variable and self-esteem, negative life events, and parenting satisfaction were the dependent measures. All analyses of variance controlled for intervention group status.

3. Results

At the time of delivery of their first child, mothers ranged in age from 13.5 to 17.9 years (Mean = 16.3 years, SD = 1.0), most were in high school ($N = 150$; 83%), and almost two-thirds reported having a romantic relationship with the father of the baby ($N = 116$; 66%). Infants were approximately 2.5 weeks of age at the baseline visit (SD = 2.3) and 50% of the infants were male ($N = 91$). At 24 months postpartum, mean self-esteem scores were 3.45 (SD = 0.47). Mean life events scores were 17.39 (SD = 10.70) and mean parenting satisfaction scores were 4.25 (SD = 0.83). Most adolescent mothers continued to live with grandmothers at the 6 month (92%, $N = 136$) and 24 month (74%, $N = 108$) assessments.

On average, BDI scores were highest at the baseline visit, with half of mothers (49%) reporting depressive symptoms above the cutoff of 9. The percentage of mothers reporting depressive symptoms (BDI > 9) declined to approximately 37% at both the 6 and 24 month visits (see Table 1). Results from the correlation analysis revealed statistically significant correlations among BDI scores across all visits (range $r = 0.28$ to $r = 0.50$; Table 2).

Developmental trajectory models were estimated for depressive symptoms assessed at baseline, 6, and 24 months postpartum. Maximum likelihood estimation was used to estimate the trajectories. This method identifies the shape of each group's trajectory, the proportion of the sample belonging to each group, and the posterior probability of group membership for each participant. Based on these calculations, participants are assigned to the group that best conforms to their trajectory of depressive symptoms.

Model selection requires a determination of the number of groups that best describes the data. The Bayesian Information Criterion (BIC) is one method of identifying the optimal model (Jones et al., 2001; Nagin, 1999; 2005). A two-group model (BIC = −1532.44) was identified initially, with a high depressive symptom group that continued to increase over time (14%, $N = 25$), and a low depressive symptom group whose scores decreased slightly over time (86%, $N = 156$). A three-group model was tested to explore whether subgroups existed within the large low depressive symptom group. The three-group solution retained the large low depressive symptom group and separated the high depressive symptom group into two very small, similar groups.

Therefore, we performed a second trajectory analysis on the low depressive symptom group alone, after removing the high depressive symptom group from the first analysis (B. L. Jones, personal communication, May 26, 2009). The results indicated that two distinct trajectories exist within the low group, one that has moderate depressive symptoms near the cutoff of 9 ($N = 82$) and one that has consistently low depressive symptoms ($N = 74$). Combining the results of the trajectory analyses, three groups were retained and used in subsequent analyses. Fig. 1 graphs the actual versus predicted trajectories by group. The first group, Low Depressive Symptoms, (41%, $N = 74$) has BDI scores below the cutoff of 9 at each time point. The mean score was near 7 at baseline, decreased slightly during the first 6 months postpartum, and remained stable through 24 months. The second group, Medium Depressive Symptoms, (45%, $N = 82$) has BDI scores above the clinical cutoff at baseline that decrease slightly over the first 6 months postpartum but remain above the cutoff. This group's scores continue to decline to just under the cutoff

Table 1
Means and standard deviations of maternal Beck Depression Inventory scores at each assessment.

	Beck Depression Inventory		
	Baseline $N = 177$	6 months $N = 137$	24 months $N = 139$
Mean	11.12	9.15	8.81
Standard Deviation	7.83	8.12	9.52
Clinical Cutoffs (N (%))			
Non-depressed (BDI ≤ 9)	90 (51)	86 (63)	89 (64)
At-risk for depression (BDI > 9)	87 (49)	51 (37)	50 (36)

Note. Sample sizes presented above include adolescent mothers with complete Beck Depression Inventory data at each assessment.

Table 2
Spearman Rank-order correlations among Beck Depression Inventory scores for each possible pair of postpartum assessments.

	Baseline	6 months
6 months	0.38** (134)	1.0
24 months	0.28** (138)	0.50** (113)

Note. Sample sizes presented above include adolescent mothers with complete Beck Depression Inventory data on paired assessments.
** $p < 0.01$.

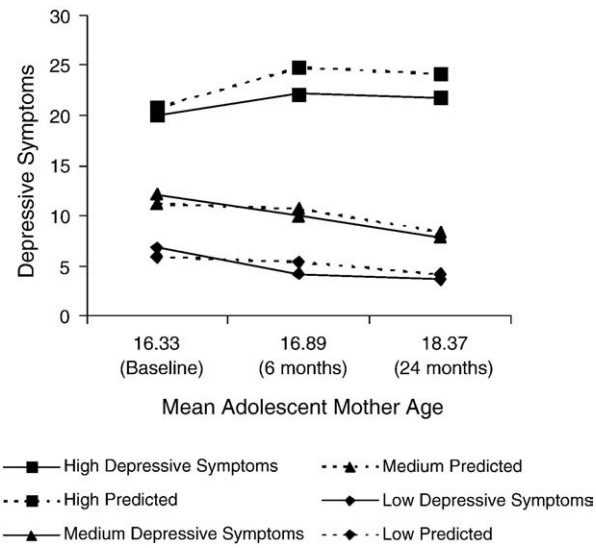

Fig. 1. Actual versus predicted trajectories of depressive symptoms. Low Depressive Symptoms, (41%, $N = 74$), Medium Depressive Symptoms (45%, $N = 82$), High Depressive Symptoms (14%, $N = 25$).

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Table 3
Depressive trajectory group comparisons on 24 month variables.

	Low depressive symptoms ($N=74$)	Moderate depressive symptoms ($N=82$)	High depressive symptoms ($N=25$)
	Mean (SD)	Mean (SD)	Mean (SD)
Self-esteem	3.71 (0.30)[a]	3.36 (0.46)[a]	3.04 (0.50)[a]
Life events	14.97 (9.96)[a]	17.56 (10.48)[b]	23.35 (11.26)[a,b]
Parenting satisfaction	4.62 (0.76)[a]	4.08 (0.74)[a]	3.70 (0.78)[a]

Note. All comparisons controlled for intervention group status. Identical superscripts indicate statistically significant group differences ($p<0.05$).

by 24 months. The third group, High Depressive Symptoms (14%, $N=25$) has BDI scores near 20 at baseline, with scores that continue to increase slightly over the first 24 months postpartum.

Self-esteem scores varied significantly by the depression groups. Self-esteem scores were lowest in the High Depressive Symptoms group, moderate in the Medium Depressive Symptoms group, and highest in the Low Depressive Symptoms group (Table 3). Life event scores were associated with depression trajectories, with the High Depressive Symptoms group reporting significantly more negative life events than the Low and Medium Depressive Symptoms groups (Table 3). Parenting Satisfaction scores also differed significantly by the depression groups. The High Depressive Symptoms group had the lowest parenting satisfaction scores, followed by the Medium Depressive Symptoms group and the Low Depressive Symptoms Group (Table 3).

4. Discussion

This study provides evidence documenting high rates of self-reported depressive symptoms among young mothers, ranging from 49% shortly after delivery to 36% at 24 months. To our knowledge, this is the first longitudinal investigation to examine the rate and stability of depressive symptomatology during the first 24 months of parenting in a sample of exclusively African American, adolescent first-time mothers. The rate of depressive symptomatology in this community sample is comparable to reports from community samples of adult mothers (Beeghly et al., 2003; Beeghly et al., 2002) and other high risk-samples (Beck, 2001; Beeghly et al., 2003; Boury et al., 2004; Coiro, 2001; Colletta, 1983; McLennan et al., 2001; Seguin et al., 1999; Walker et al., 2002). The rates of reported depressive symptomatology are higher than reported in similar samples of adolescent mothers (Barnet et al., 1996; Birkeland et al., 2005; Schmidt et al., 2006) and adolescents in general (Lewinsohn et al., 2000).

4.1. Stability and pattern of symptoms

The pattern of depressive symptoms with high postpartum rates, followed by a decline in rates at 6 and 24 months after delivery, has been described previously (Beeghly et al., 2002; Birkeland et al., 2005; O'Hara, 1997; Schmidt et al., 2006; Stamp et al., 1995). Maternal hormones stabilize several months after delivery, mothers adjust to the demands of caregiving, and for many mothers depressive symptoms decline. What is unusual about our findings is that over one-third of the adolescent mothers (36%) continue to have depressive symptoms at 24 months.

Ongoing depressive symptoms could be maintained by internal processes or by external demands, such as life stressors, childcare responsibilities, or the end of the honeymoon period of motherhood. One possible explanation may be the changing caregiving demands that occur from infancy to toddlerhood. In the first year of life, infant development is dominated by sensorimotor tasks, such as learning to stand, walk, and talk. In contrast, the transition into the increasing autonomy and independence that characterize toddlerhood can be challenging for some parents as toddlers test limits. The inquisitiveness and demandingness of toddlers may be particularly difficult for first-time mothers who are experiencing depressive symptoms. Young, single, unemployed, African American mothers are at particularly high risk for symptoms of depression (Evenson and Simon, 2005). Although Schmidt and colleagues (2006) did not report an increase in depressive symptoms at 24 months, 17% of the adolescent mothers in that study had older children, perhaps preparing them for the changes involved in transitioning from infant to toddler care.

When trajectories of depressive symptoms among adolescent mothers were considered, the patterns were generally consistent with patterns described among adolescents in general (Dubois et al., 1995; Mora et al., 2009; Repetto et al., 2004). Three patterns of depressive symptoms over the first 2 years of parenting were identified within this sample of low-income African American adolescent mothers. First, over 40% of the mothers followed a pattern of low levels of depressive symptoms across all time points. The Low Depressive Symptoms group of mothers had significantly higher scores on measures of self-esteem and parenting satisfaction than mothers in trajectories associated with medium or high depressive symptoms and lower scores on a measure of negative life events than mothers with high depressive symptoms. This suggests that mothers in the Low Depressive Symptom group are psychologically strong enough to avoid the depressive symptoms that are relatively common among adolescents and new mothers.

Second, nearly half of the mothers followed an intermediary pattern of depressive symptomatology across time, reporting levels of depressive symptoms slightly above the clinical cutoff point of 9 during the first 6 months postpartum that decreased slightly through 24 months. Mothers in the Medium Depressive Symptoms group scored in the clinical range, but symptoms remained relatively close to the cutoff point and were never severe. They obtained intermediate scores on measures of self-esteem, life events, and parenting satisfaction, providing validity for their intermediate position.

The third group is comprised of mothers with extremely high levels of depressive symptomatology across all three time points. Although this group is relatively small (14%), these mothers are the most severely and chronically depressed in the sample. Mothers in the High Depressive Symptom group had significantly lower scores on measures of self-esteem and parenting satisfaction, and reported more negative life events than mothers in either the Low or Medium Depressive Symptom group, providing evidence for the psychological vulnerability of the mothers in this group.

Maternal depressive symptoms that persist more than 6 months are likely to negatively affect infant and children's

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behavioral regulation and development (Field et al., 1990; Murray et al., 1993; Rosenblum et al., 1997; Smyke et al., 2002) through adolescence (Pawlby et al., 2009), illustrating that the societal burden of maternal depressive disorders increases the risk for developmental problems in the next generation (Hammen and Brennan, 2003; Hammen et al., 2004; Murray et al., 1996; Weissman et al., 2005).

The mood disturbances and adverse conditions that often accompany depressive symptoms are likely to interfere with sensitive and responsive parenting (Hammen et al., 2004; Lovejoy et al., 2000), and pose significant risk for psychosocial and achievement problems in their children (Downey and Coyne, 1990; Hammen, 1991; Kurstjens and Wolke, 2001). Chronically depressed mothers may have substantial difficulty dealing with their 24-month-old toddler's behavior, thereby increasing the vulnerability of their toddlers (NICHD, 1999).

4.2. Methodological considerations

Interpretation of these results should be made with several limitations in mind. First, although the data were collected longitudinally using a well-standardized measure of depressive symptoms with adequate psychometric properties, depressive symptoms were self-reported and not verified with a clinical interview. Second, the findings are limited to low-income, urban African American adolescent mothers and may not be generalizable to other populations. Third, there is no clear consensus on a cutoff point for depressive symptoms among adolescents using the Beck Depression Inventory. Although many researchers have used a cutoff point of 9, others have used higher cutoff points, including 13, 16, or 20 (e.g., Hellin and Waller, 1992; Leadbeater et al., 1996; Steer et al., 1990). In an effort to remedy this limitation, the analyses in this study were done using a continuous measure of depressive symptoms. Finally, half the adolescent mothers participated in an intervention (Black et al., 2006). Although the intervention was not designed to address depressive symptoms and there were no differences in depressive symptoms between the two groups, there may have been unmeasured effects of the intervention.

4.3. Implications for programs and policy

The relatively high prevalence of depressive symptoms reported among adolescent mothers through the first 2 years of parenting illustrates the burden of disease associated with maternal depression and the potential risks to their children. Adolescent mothers may be more likely to come into contact with their child's pediatric primary care provider than with their own health care provider. Recent evidence suggests that routine, brief screening for maternal depressive symptoms conducted during pediatric well-child visits is a feasible and effective method for identifying mothers with depressive symptoms (Olson et al., 2006). Not only were mothers willing to talk to their children's pediatric primary care provider about depressive symptoms, but brief interventions, including referrals for further evaluation and intervention were likely to improve parent's and children's health outcomes (Flynn et al., 2004). A recent review noted that brief psychosocial support delivered in primary care, sometimes augmented with medication, was effective in reducing depressive symptoms among adolescents (Stein et al., 2006).

Although screening and brief intervention may be an effective treatment model for adolescent mothers with relatively mild symptoms of depression, it is likely that mothers consistently reporting high levels of symptoms will require more intensive treatment. Most screening measures do not have the sensitivity needed to differentiate between high and low levels of depressive symptoms, thus necessitating further evaluation. Mothers reporting multiple depressive symptoms may meet criteria for a diagnosis of major depression (American Psychiatric Association., 2000), requiring follow-up and clinical intervention, including a combination of medication and psychotherapy. Evidence-based treatments using developmentally sensitive, culturally competent biopsychosocial approaches have led to reductions in depressive symptoms among adolescents (Kaslow et al., 2002; Mufson et al., 2004).

4.4. Future directions

Now that the prevalence of depressive symptoms has been well established, the next steps are to investigate the mediating and moderating factors in the connections between maternal depressive symptoms, child adjustment, and overall family functioning (Goodman and Gotlib, 1999) and to identify strategies to prevent the intergenerational transfer of maternal depressive symptoms. Additional longitudinal studies are needed to examine the developmental trajectories of mothers and children, including mothers who are resilient, as well as those who are vulnerable to mental health related problems (Elgar et al., 2004). Future research should also address how maternal depressive symptoms that persist throughout early parenting affect functioning and wellbeing of the mothers themselves, their young children, and other family members, as well as investigate the mechanisms that protect family members from mental health and other related psychosocial and developmental problems (Goodman and Gotlib, 1999; Hammen, 2003).

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Conflict of interest

All authors declare that they have no conflicts of interest.

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