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Mental health and functioning of children of low-income depressed mothers: Influences of parenting, family environment, and raters

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Abstract

Purpose—To extend understanding of the effects of maternal depression on children to low-income and minority families; to apply advanced analytic methods to incorporate the reports of mothers, fathers, and teachers on the emotional and behavior problems and adaptive skills of 4–10 year old urban children; and to examine parenting quality and family environment as possible explanations of high rates of problems among children whose mothers have depression compared to those whose mothers are not depressed.

Methods—Mothers who participated either had major depressive disorder ($n=84$) or did not ($n=49$). They were predominantly African-American or Latino and lived in low-income, urban communities. Mothers, fathers, and teachers reported on children's emotional, behavioral and adaptive functioning. Parenting behavior and family stress were examined as potential mediators and generalized estimating equations (GEE) were employed to test mediation and to account for discrepancies in reports by different raters.

Results—By mother, father and teacher reports, children of depressed mothers had significantly poorer adaptive skills than children of sociodemographically-similar non-depressed mothers; and they had more emotional/behavior problems according to mothers and fathers. The quality of mothers' parenting mediated these associations, but quality of the family environment did not.

Conclusions—This study extends the literature on the effects of maternal depression to low-income, minority families, and demonstrates that mothers, fathers and teachers observe worse functioning in children of depressed mothers than those of non-depressed mothers, although their perspectives vary somewhat. The impact of maternal depression suggests the importance of developing and funding services to address the needs of affected families.

Depression is the most common psychiatric condition in mothers and is associated with significant psychiatric and functional problems in their children (1–4). Understanding the mechanisms by which these poor outcomes develop is critical for designing preventive interventions to reduce the impact of maternal depression on children. Genetic factors are likely to play a significant role (5, 6), but the parenting and stressful family situations these children experience have also been shown to make substantial contributions to their mental health problems.

When mothers are depressed they are less likely to have positive relationships and good communication with their children (7, 8), and to engage in proactive discipline strategies (3, 9, 10). Moreover, the family environments of depressed parents are characterized by major stressful life events and conflict (11, 12). They also have lower social support (13) and family cohesion (14) than families not affected by parental depression. These are critical factors known to lead to poor child adjustment (3, 15, 16). Low-income families in urban environments are especially likely to experience major stressors associated with inadequate resources and unsafe communities (7,22).

However, only a few studies have explicitly tested whether the quality of parenting and the family environment can explain the differences in children's behavior that are associated with maternal depression. Those that have studied mechanisms have included mothers with distress but not diagnosed depression (23–26) and have relied on depressed mothers' reports of child behavior although these may be distorted by mothers' negative cognitions (27, 28).

The current study investigates the influence of maternal depression, parenting and family stressors on 4 – 10 year old children whose functioning and problems are rated by their fathers, teachers, and mothers in a cross-sectional design. It involves a non-treatment-seeking sample of mothers who have been diagnosed with major depressive disorder and a similar sample of mothers and children from the same low-income urban communities who have not experienced maternal depression. Data were collected in 2000–2003. Most mothers are African-American or Latina. We hypothesize that children of depressed mothers will have more problems and worse functioning than their peers whose mother is not depressed and that poor quality parenting, and low support and high stress within the family account for these negative effects.

Methods

Participants

Mothers of 4–10 year old children who were participating in a randomized controlled trial of the effectiveness of depression treatments for low-income, minority women (29) were eligible to participate in a sub-study focusing on children. In the treatment study, 66% of eligible women who screened positive for depression participated. Of the 223 mothers who were eligible for the child study, 133 (60%) participated. They gave written informed consent to participate with their 4–10 year old child. Two-thirds of the mothers had major depressive disorder and the others were free of psychiatric disorder. There were no differences between those who did and did not participate in terms of maternal age, ethnicity, number of children, relationship to child, child age, child gender, or among the depressed women, their initial depression score.

Mothers were an average of 31 ± 6.13 years old; 58 (44%) were African American, 70 (53%) were Latina first generation immigrants (52%), and 5 (4%) were Caucasian. Almost all were biological mothers ($n=130$; 98%). Women in the depressed group ($N=84$) met criteria for current major depressive disorder on the CIDI (30); the comparison group ($N=49$) had no current or past psychiatric disorders. Sixty (71%) of the depressed mothers had comorbid anxiety disorders, but mothers were excluded if they had bipolar disorder, active substance dependence, psychotic disorder, or were pregnant or breast-feeding (29). Depressed mothers reported a mean age of onset of 25 years (range 7 to 53), an average of 4.5 lifetime episodes (range 1–25 ± 4.9), and were assessed as having mild to moderate depression.

Children included 63 boys and 70 girls (mean age = 6.6 ± 2.1 years). Children with severe learning disabilities, mental retardation, or other developmental disabilities were excluded. Descriptive information on each subsample is contained in Table 1.

Half of the children had a biological father living in the home. For the others, a father or father figure was selected if the child saw him at least once per week, with the selection done according to this priority order: 1) biological father not in the home; 2) foster, step or adoptive father in the home; 3) step or adoptive father not in home; or 4) the person the mother described as “most like a parent” to the child. This procedure yielded a father figure (hereafter referred to as ‘father’) for 122 (92%) of children. Of these, 111 (91%) mothers gave consent to contact the father for a phone interview, and 83 father interviews (62% of sample) were completed. Among participating fathers 75% lived in the home, and 60% were biological dads; rates that were not significantly different from the non-participating fathers. From among the 118 children who attended school, teacher interviews were completed with 89 (75%).

Measures

Maternal depression—Women were screened for depression using the PRIME-MD (31) which has been validated as an effective method for identifying depression in primary care medical patients (32, 33). Women who screened positive were assessed by trained lay interviewers with the Comprehensive International Diagnostic Interview (CIDI) (30), a

structured psychiatric interview that employs the criteria of the Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) (34).

Sociodemographic characteristics—Mothers reported their age, ethnicity, education, marital and employment status, income, receipt of public income assistance and the child's age, ethnicity, gender, and grade in school.

Children's emotional/behavior problems and adaptive skills—Mothers, fathers, and teachers completed the appropriate version of the BASC, the Behavior Assessment System for Children (35) which provides a parent report scale and teacher report scale for pre-school ages (4–5) and children (ages 6–11). The BASC is a set of conceptually-based scales for rating child behavioral and emotional problems and social and adaptive functioning on a 4 point frequency scale. Results are reported in t-scores (mean = 50, standard deviation ± 10 , range 0–100) that are age- and gender-normed based on a nationally representative sample. Both age versions of the parent and teacher report scales include two aggregate scales, the behavioral symptoms index (BSI) and adaptive skills composite (ASC). The BSI is a measure of emotional and behavior problems that combines the subscales of depression, anxiety, aggression, and hyperactivity, attention problems, and atypicality. Higher BSI scores indicate more problems. The ASC measures social and adaptive functioning by combining the subscales of social skills, leadership, adaptive skills, and (from teachers only) study skills. Higher ASC scores indicate better functioning. The aggregate scales in both versions have excellent reliability, with internal consistency coefficients $>.85$, and retest reliability above $.90$ (35, 36).

Composite measures of parenting and family environment: In order to provide a single robust, composite measure of parenting and of family environment, multiple scales completed by mothers were subject to Principal Components Analysis. For both constructs, the first factor was used as the composite measure, as it explained a large amount of the variance and adequately fit the data (Kaiser-Meyer-Olkin test of sampling adequacy or $KMO = .58$ and $.73$, for parenting and family environment, respectively). The two composite scales were standardized using z scores (mean = 0, $SD \pm 1$, range $-3.0 - 3.0$), and coded so that higher scores indicate more positive parenting and family environment

The parenting quality composite includes four variables: two subscales from the Children's Report of Parental Behavior Inventory (CRPBI (37, 38), rejection (10 items; $\alpha = .72$) and consistent discipline (8 items; $\alpha = .83$) and two subscales of the Conflict Tactics Scale – Parent Child version II (CTSPC-II) (39), non-violent discipline (4 items; $\alpha = .76$) and psychological aggression (5 items; $\alpha = .77$).

The family environment composite includes five variables: stressful life events that the family had experienced in the prior year, adequacy of 15 resources assessed using the Family Resources Scale (FRS) (40) family involvement based on the 8-item subscale from the parent report of the Child Health and Illness Profile-Child Edition (CHIP-CE) (41); emotional and instrumental social support (42), and marital/relational conflict (42). Additional details on these composites are available from the first author.

Procedures

Recruitment was a multi-stage process involving screening for depression in over 20 public health and social service settings and confirmation of the diagnosis by the CIDI structured interview. Eligible mothers were recruited into the child study by the staff of the treatment study (29). All procedures were approved by the relevant institutional review boards.

All mothers, depressed and not depressed, completed a 2–3 hour interview in their home that was conducted by trained interviewers blind to mothers' depression and treatment status. Separate interviews with children lasted 45 – 90 minutes. Interviews were completed in Spanish, as needed, by bilingual interviewers. Interviews were completed an average of 7.8 ± 5 weeks after mothers' identification for the treatment study, with 16 (19%) depressed mothers having a treatment visit at least 1 day prior to the baseline interview for the child study. No effects of beginning treatment prior to the baseline child study interview have been detected using multiple analytic approaches.

Data analysis strategy

Multi-reporter, cross-situational assessments of children's behavior and social competence were obtained to reduce the bias of any one reporter, but the reports were too poorly correlated (range = .21 – .42) to simply combine them, a finding typical in the informant concordance literature (27, 43–47). Generalized Estimating Equations methodology (GEE) (48) was used to examine the extent to which mothers', fathers', and teachers' reports of each of the child outcomes were concordant, and when they were not linear regression models were fit that allowed the estimate of the association between child outcomes and independent variables to vary by rater, while appropriately taking into account the correlation of child outcomes across the three raters. Specifically, we estimated the association between the child outcomes (emotional/behavior problems on the BASC BSI and adaptive skills on BASC ASC) and maternal depression and sociodemographic control variables, separately for each rater. Multivariate Wald statistics, appropriate to GEE (49), were used to test whether the data supported the use of rater-specific associations for i) maternal depression or ii) sociodemographic control variables. Simplified models were fit when associations were found not to vary across raters (Wald test p -value > 0.05), using the mean of the associations for all raters. When associations varied by rater, rater-specific associations were included in the model. We then tested whether parenting and family environment characteristics mediated the association between maternal depression and children's outcomes applying Baron and Kenny's methodology (50, 51).

Results

Non-depressed mothers were more likely to be married, to have the biological father in the home, and to have families with slightly higher incomes (Table 1). Only mothers' marital status and family income were used as control variables because having the biological father in the home was so highly correlated with marital status ($r = .72$, $p < .001$). As 9 mothers reported no monthly family income, income is modeled with two variables: a dichotomous variable of \$0 vs. any family income (labeled 'zero income'), and among those reporting any income, a continuous measure of the natural log of annual income per household

member (labeled 'income level'). Child age, gender, and ethnicity, although not significantly different between the groups, were also entered as controls. None of the associations between these control variables and the BASC scales varied according to the rater of the outcome.

Rater Effects on Relationship between Maternal Depression and Children's Outcomes

Table 2 provides the means and standard deviations for the parent and teacher ratings on the BASC emotional/behavioral problems (BSI) and adaptive skills (ASC) scales by group. The statistical significance of these differences by rater was examined using multivariate models shown in Tables 3 and 4. Significant differences were found in the associations between maternal depression and emotional and behavior problems by rater (Wald test chi square (2) = 21.87, $df=2$; $p<.001$). Although all raters reported more problems among children of depressed mothers than non-depressed mothers, the difference between the depression groups was statistically significant only for mothers' reports (1.16 standard deviations; $p<.001$) and fathers' reports (0.50 standard deviations; $p<.05$). Teachers reported problems in the children of depressed mothers to be only 0.18 standard deviations higher than those of non-depressed mothers (ns; Table 3, column 1). Hispanic race, younger child age, and no family income were also statistically significantly related to lower levels of behavior problems.

The association between maternal depression and children's adaptive skills did not differ based on whether the rater was the mother, father, or teacher (Wald test chi-square (2) = 2.57, $df=2$; ns). For all raters combined, children of depressed mothers were rated as having statistically significantly lower adaptive skills by approximately one-third of a standard deviation (.35) than children of non-depressed mothers (Table 4, column 1). Additionally, children of married mothers were rated as having slightly higher levels of adaptive skills.

Potential Mediators Between Maternal Depression and Child Outcomes: Parenting and Family Environments

The first criterion for mediation being met, that of a significant relationship between the independent and dependent variables, regression analyses were conducted to determine whether maternal depression was significantly related to the potential mediators in the presence of control variables, the second criterion for mediation (50). Maternal depression status was significantly related to both parenting quality ($t = 4.56$, $df=2$; $p<.001$; effect size = $-.86$, 95% CI = $-.90$ to $-.36$) and family environments ($t = 7.43$, $df=2$; $p<.001$; effect size = -1.23 , 95% CI = -1.07 to $-.67$), indicating that both could be examined as potential mediators.

The third step in testing for mediation was carried out by adding parenting to the GEE models described above in which the children's outcomes were regressed on maternal depression status and sociodemographic control variables. More positive, less punitive parenting was associated with significantly fewer emotional and behavioral problems (Table 3, column 2, coefficient -0.23 , $p<.05$). Furthermore, mothers' parenting quality appeared to mediate partially the association between maternal depression and children's behavior problems, as reported by both mothers and fathers, because once parenting entered the

model, the coefficient for maternal depression was reduced by the same magnitude (approximately 0.15 standard deviations) for reports by both mothers and fathers, and became only marginally significant for fathers. Teacher-rated differences remained non-significant.

When parenting was added to the regression model for children's adaptive skills, the association of maternal depression with children's adaptive skills was greatly reduced and no longer statistically significant (Table 4; the difference between adaptive skills of depressed and non-depressed groups is reduced from -0.35 to -0.15 standard deviations on the BASC adaptive skills composite (ASC). Thus, parenting quality fully accounts for the relationship between maternal depression and children's adaptive skills, acting as a mediator between them.

Family environment was not a significant predictor of children's emotional/behavior problems or adaptive skills, controlling for maternal depression, thus eliminating the possibility of mediation (Tables 3 and 4, column 3, as indicated by the non-significant coefficient for family environment).

Discussion

This study extends prior research in several ways. First, the application of GEE allowed us to use data from multiple raters, allowed sample sizes to vary by rater, control for rater effects when they existed, and to demonstrate the pervasive extent of problems in functioning and emotions and behaviors among the children of depressed mothers relative to similar low-income, primarily minority children whose mothers were not depressed. We show that fathers report a moderate effect of maternal depression on children's emotional/behavioral problems (0.5 standard deviation difference between groups), that the effect (difference between groups) according to mothers is much larger (1.16 standard deviation) and differences in emotional and behavior problems between the groups by teacher reports are non-significant. Quantifying these rater differences in emotional/behavioral problems helps inform the literature on the cognitive bias associated with maternal depression (6, 27) by highlighting how the perspectives of different raters differ. Also important in terms of measurement is that all raters observed similar levels of impaired adaptive functioning for children of depressed compared to not depressed mothers, even teachers who did not observe differences in emotional/behavior problems.

Second, we extended prior research indicating that parenting which lacks warmth, is inconsistent, and involves harsh discipline may be an important mechanism by which maternal depression is associated with children's emotional and behavioral problems and poor adaptive skills. The latter finding is consistent with prior longitudinal research using non-clinical but low-income samples (23, 53). The fact that mediation was observed for fathers' reports of child problems and functioning is particularly informative, adding an independent, potentially more objective, outcome assessment than that of mothers when they are depressed. Contrary to our hypotheses, family environment was not a mediator of these associations, primarily because it was not associated with the outcome variables once maternal depression was controlled.

Despite large and statistically significant differences between the children of depressed and non-depressed mothers, the average BASC problem and adaptive scores were not in the clinical range for either group. The young age of this cohort may explain why their problems are not as severe as those typically observed in studies with the older children of depressed mothers (3, 15, 16). As would be expected from the low number with clinically defined need for services, less than 10% of the children of depressed mothers and none of the children of non-depressed mothers had received any mental health treatment. Although Hispanic children had fewer behavior problems overall, separate analyses have demonstrated that the basic effect of maternal depression did not vary by ethnicity in that both Hispanic and African-American children of depressed mothers had significantly more problems than their peers with non-depressed mothers.

Several limitations must be considered in interpreting these results. First, cross-sectional evidence of mediation by parenting is only the first step in demonstrating a possible causal pathway. Longitudinal analyses are needed to confirm the mediational pathways between maternal depression and child outcomes. Participant recruitment was an anticipated and significant difficulty, as the very characteristics that make the lives of these mothers and families important to understand also make it very challenging to involve them in research. Consequently, in both the women's treatment study and study of children, approximately one-third of eligible participants did not complete data collection, largely because of difficulty contacting them. Furthermore, sample sizes vary depending on the reporter of the measures and many mothers were interviewed later than planned. Finally, a few mothers had their first treatment appointment and a few others knew their treatment assignment prior to their child study interview, so expectations regarding treatment may have influenced their ratings. However, we have not been able to detect any evidence of this effect. Further longitudinal analyses with this sample will explore the extent to which children's behavior and functioning improves when mothers' depression is treated, as well as whether their need for mental health services increases over time when maternal depression does not remit.

Conclusions

This study provides evidence that the behavioral, emotional, and functional problems of children of depressed mothers living in low income, high risk urban environments are significantly greater than those of similar children whose mothers do not have depression, thus extending this body of research to low income, minority families. These differences in outcomes were observed by mothers, fathers, and teachers, despite important distinctions in their perceptions. The multi-informant, cross-situational nature of the data on children's problems and adaptive functioning and our ability to control for rater effects enhances the strength of the finding that the associations with maternal depression are likely to be mediated through the quality of mothers' parenting.

Depression is most common in low-income, minority, urban families (59, 60), and based on the results of this study appears to confer a level of risk for children over and above that of poverty. It is worth noting that although the children of depressed mothers have significantly more problems than children of non-depressed mothers, most are not in the clinical range on the behavior scales suggesting that some children/families are more able to cope, at least

during childhood, with the stressors associated with maternal depression. Nonetheless, such early problems often create negative trajectories that increase the likelihood of significant emotional and physical health problems later in life (61), highlighting the importance of developing policies and practices to address the health services needs of these children and families (62).

Ensuring effective treatment for depressed mothers is critical (63–65). But these results indicate that family level services are likely to also be necessary (56, 58). It will be important to translate promising new family interventions(54–58) into routine services designed to enhance parenting in families affected by maternal depression. To produce an impact they will not only have to be effective, but also accessible. Adequate mechanisms for reimbursing family intervention services will be needed in order to stimulate the development and adoption of such services. Enhancing the opportunities for intervening with families affected by maternal depression is one important avenue for addressing the multiple needs of these children and families and may help reduce the distress and problems they often experience.

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Table 1

Sociodemographic Characteristics by Mother's Depression Status

	Depressed Mothers Group (n=84)		Non-Depressed Mothers Group (n=49)	
	Mean±S.D.		Mean±S.D.	
Mother's age	31.3±6.6		31.0±5.2	
Years in US (Latina women)	7.6±4.2		9.1±4.9	
Annual income per household member	\$3647±3478		\$4889±2773 *	
No. people in the household	5.5±1.9		5.4±1.6	
Child's age	6.4±1.9		6.9±2.3	
	N	%	N	%
Child is female	44	52%	26	53%
Mothers' ethnicity: Black	36	43%	22	45%
White	2	2%	3	6%
Latina	46	55%	24	49%
Mother is high school graduate	52	62%	34	69%
Mothers' marital status: Married/Cohabiting	36	43%	30	61% *
Separated/Divorced/Widowed	20	24%	5	10%
Never Married	28	33%	14	29%
Mother worked for pay last 3 months	59	70%	36	74%
Mother received any public assistance ^a	77	92%	48	98%
Mother is the only adult in home	14	17%	10	20%
Father/father figure lives in home	59	70%	39	79%
Biological father lives in home	33	39%	29	59% *

* p<.05

Data in columns are means ±standard deviations or percentage of the sample.

^aIncludes food stamps, welfare, unemployment benefits, SSI/disability, WIC, and free or reduced lunch program

Table 2

Means and standard deviations for dependent variables by mother's depression status

	Depressed Mothers Group		Non-Depressed Mothers Group	
	Mean	Standard Deviation	Mean	Standard Deviation
Mother report:				
BSI	54.50	12.52	40.16	7.81
ASC	46.29	10.02	52.76	11.11
Father report:				
BSI	46.17	13.67	40.50	11.07
ASC	51.09	9.98	53.89	9.92
Teacher report:				
BSI	49.66	10.53	48.03	9.87
ASC	50.40	10.20	52.50	9.42

BSI = BASC Behavior Symptoms Index t-score range 0–100, higher score = more problems;

ASC = BASC Adaptive Skills Composite t-score range 0–100, higher score = better functioning

GEE# Regression Model: Effects of Maternal Depression, Sociodemographic Factors and Potential Mediators on Children's Emotions and Behavior

Table 3

	Depression only		Add Parenting		Add Family Environment	
	B	SE B	B	SE B	B	SE B
Effect of depression						
Rater: Mother	1.16***	0.18	0.99***	0.20	1.03***	0.20
Rater: Father	0.50*	0.22	0.35^	0.25	0.35^	0.24
Rater: Teacher	0.18	0.21	-0.07	0.23	0.03	0.23
Family income (level)						
	-0.01	0.10	-0.03	0.10	0.02	0.10
Family income (zero)						
	-0.45*	0.25	-0.29	0.25	-0.39^	0.25
Marital status ¹						
	0.02	0.14	-0.04	0.16	0.07	0.15
Child age						
	0.05^	0.03	0.01	0.03	0.05^	0.03
Child gender ²						
	-0.15	0.13	-0.20^	0.14	-0.11	0.13
Child ethnicity ³						
	-0.24*	0.14	-0.27*	0.15	-0.27*	0.14
Parenting						
	----		-0.23*	0.10	-----	
Family environment						
	----		----		-0.18^	0.13
Sample size						
	N=126		N=99		N=126	

^ p<.10;

* p<.05;

** p<.01;

*** p<.001 for 1-tailed comparisons.

GEE=Generalized Estimating Equations

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Parenting and Family Environment are scored so that higher is better.

^{1/1} Reference category= Married

² Reference category = Male

Table 4

GEE[#] Regression Model: Effects of Depression, Sociodemographic Factors, and Potential Mediators on Children's Adaptive Skills

	Depression Only			Add Parenting			Add Family Envrmt		
	B	SE	B	B	SE	B	B	SE	B
Effect of depression	-0.35**	0.15	-0.15	0.16	-0.29 [^]	0.18			
Family income (level)	0.04	0.10	0.01	0.10	0.03	0.10			
Family income (zero)	0.02	0.26	-0.09	0.26	-0.002	0.26			
Marital status ⁴	0.22 [^]	0.15	0.32*	0.16	0.19	0.15			
Child age	-0.04	0.03	-0.01	0.03	-0.03	0.03			
Child gender ⁵	0.16	0.14	0.18	0.14	0.14	0.14			
Child ethnicity ⁶	0.12	0.14	0.04	0.15	0.13	0.15			
Parenting	----		0.26**	0.11	----				
Family environment	----		----		0.09	0.14			
Sample size	N=125		N=99		N=125				

[^] p<.10;

* p<.05;

** p<.01; 1-tailed comparisons.

[#] GEE=Generalized Estimating Equations

[#] GEE=Generalized Estimating Equations

Parenting and Family Environment are scored so that higher is better.

⁴ Reference Category=Married

⁵ Reference Category= Male

⁶ Reference Category= Hispanic