Article

Parent ADHD Is Associated With Greater Parenting Distress in the First Year Postpartum

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Abstract

Objective: Little is known about the experience of parenting infants when a mother or father has ADHD. This study examined cross-sectional predictors of parenting distress experienced by parents with and without ADHD who also have infants. **Methods:** Participants were 73 mother-father pairs ($N = 146$) of infants 6 to 10 months old. Half of the families included a parent with ADHD. Psychosocial predictors were tested using multilevel modeling. **Results:** Parent or partner ADHD, lower parent sleep quality, fewer social supports, and less infant surgency and effortful control were associated with greater parental distress. Infant negative affect and sleep were not associated. **Conclusions:** Parents with ADHD and their partners experience greater parenting distress in the first year of their child's life than parents without ADHD. Addressing parent ADHD symptoms and co-occurring difficulties, including sleep disturbances, are potential targets for early interventions to maximize both parent and infant mental health outcomes. *(J. of Att. Dis. 2022; 26(9) 1257-1268)*

Keywords

ADHD, infancy, sleep, stress, temperament

Introduction

ADHD is a common neurodevelopmental disorder characterized by inattention, impulsivity, and hyperactivity with increasing recognition that many individuals with ADHD also have difficulty with emotion regulation (American Psychiatric Association, 2013; Beheshti et al., 2020). Although most often identified in childhood, ADHD can persist into adulthood and impairment is often present even if symptoms desist (Faraone et al., 2006). The overall prevalence of ADHD among adults is estimated to be 4% in the United States and 2.5% worldwide (Faraone et al., 2021; Kessler et al., 2006). Individuals with ADHD have multiple impairments spanning social, occupational, and health-related domains (Barkley, 2014; Doshi et al., 2012). A growing focus of research is on the impact of adult ADHD on the experience of parenting.

There is much known about parenting in families affected by ADHD, but these studies tend to be about parenting behaviors and experiences when the child has ADHD (e.g., Hinshaw et al., 2000; Theule et al., 2013). Much less is known about the impact of parental ADHD on the experience of parenting (Johnston et al., 2012). Despite high heritability of ADHD, studies have found that, after accounting for familial risk for ADHD, parent-controlled environments (e.g., early cognitive enrichment or level of home chaos) predict later development of ADHD (Einziger et al., 2019; Larsson et al., 2014). Thus, improving the parenting experience may improve parents' capacity to regulate and enhance their child's environment. This is particularly important in the first year of life when parents most heavily influence their child's environment and a period of time when the human brain is rapidly developing (Gao et al., 2017).

High parenting stress, the perception of excess demands relative to one's resources due to parenthood, has been linked to numerous negative outcomes for parents and children, including worse physical and mental health for the parent, less optimal parenting (e.g., harsher parenting), and greater child problem behaviors over time (Eisenhower et al., 2009; McQuillan & Bates, 2017; Neece et al., 2012). Parenting stress is commonly endorsed in the general population; a large national survey found that 13% of parents report high levels of parenting stress (Raphael et al., 2010).

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Inability to cope or maladaptive adjustment to parenting-associated stressors can significantly increase parental stress. Given the unique challenges faced by adults with ADHD, including disorganization, difficulty with time management, poor working memory, and emotional dysregulation, families with parental ADHD should be at increased risk for experiencing parenting stress but there are few data on this association and particularly in the first year of parenting. This is a significant gap in the literature given that parenting behaviors known to be affected by stress (e.g., warmth and support, positive communication) also influence brain development at this time (Crnic et al., 1983; Spinelli et al., 2013).

In addition to understanding the magnitude of stress experienced in the first year of parenting in relation to adult ADHD, identifying factors that contribute to this stress is important for prevention efforts. The Parent-Child-Relationship Stress theory is a widely referenced conceptual model of parenting stress (Deater-Deckard, 2004). Although typically examined in the context of parental depression or among families of children with chronic illnesses and disabilities, this theory emphasizes the importance of considering both parent and child factors associated with parental distress. One factor that is especially pertinent in this developmental window is sleep. New parents experience frequent sleep disruptions due to nighttime care for their infant. Sleep changes across the first postpartum year can have a negative impact on mood, relationships, and quality of life (Da Costa et al., 2021; Medina et al., 2009; Simard et al., 2021). Studies of parents of infants and toddlers have also identified that the quality of the child's sleep predicts parent's sleep quality (Meltzer & Mindell, 2007; Sinai & Tikotzky, 2012). Moreover, both the parent's and their child's sleep are related to parenting stress such that worse sleep quality is associated with greater parenting distress (Atzaba-Poria et al., 2010; Hoffman et al., 2008; McQuillan & Bates, 2017; Meltzer & Mindell, 2007; Sinai & Tikotzky, 2012). Given that adults with ADHD report significantly worse sleep than adults without ADHD, it is likely that parents with ADHD, compared to parents without ADHD, experience greater sleep disruption in the postpartum period (Díaz-Román et al., 2018). Additionally, infants at familial risk for ADHD have been found to have poorer sleep than infants without a family history of ADHD (Keating et al., 2021). Together this suggests that sleep of the parent and of the infant might be worse in the presence of parental ADHD and may increase parenting-related distress. This association has yet to be tested.

Another parent-level factor that should affect the parenting experience is social support. Having a robust social support system can provide resources, including emotional support and access to childcare. In fact, a vast literature, primarily focused on parents of children with disabilities, supports this notion with numerous studies finding a negative association between social supports and parental stress (See review by Boyd, 2002; Guralnick et al., 2008; Shin et al., 2006; Zeng et al., 2020). Deater-Deckard (1998) emphasizes the importance of the link between social supports and parenting stress for high-risk families. Different risk groups have been found to vary in the types of social support deficits (e.g., high- vs. low-educated mothers) although the relation between social supports and parent stress remains the same across groups (Parkes et al., 2015). Parents affected by ADHD should be at especially elevated risk for having fewer social supports given the many studies that have documented impairments in interpersonal functioning associated with ADHD (Barkley et al., 2010; Biederman et al., 2006; Molina et al., 2014).

Finally, just as infant sleep may be important for parent stress, infant temperament may also contribute in families where a parent has ADHD. Infant temperament has been examined in relation to parental stress for mothers with and without psychiatric disorders. Infants at familial risk for ADHD have been found to have more difficult temperament (e.g., more anger/irritability, greater activity levels, and less effortful control) compared to infants at low familial risk for ADHD (Auerbach et al., 2008; Sullivan et al., 2015). Mother's perception of their infant as having a more difficult infant temperament was significantly associated with greater parental distress and easy temperaments were associated with less parental distress (Moe et al., 2018; Siqveland et al., 2013). Interestingly, mothers of infants born to fathers with elevated ADHD symptoms have been found to be less responsive than mothers of infants at low familial risk for ADHD (Landau et al., 2009, 2010). This could represent the effect of challenging infant temperament, commonly reported amongst children at high risk for developing childhood ADHD, on the parenting experience (Einziger et al., 2018; Willoughby et al., 2017). Whether this translates to increased parenting stress is unknown.

While most studies of parental stress focus on a single parent, parenting stress among families with ADHD should examine both parents as increased stress among co-parents affected by ADHD is plausible. Problems with romantic partners is amongst the interpersonal difficulties experienced by adults with ADHD and may contribute to parenting stress. For example, more ADHD symptoms are associated with greater stress and maladaptive coping strategies in romantic relationships for young adults (Overbey et al., 2011). Adults with ADHD have also been found to have lower romantic partner satisfaction, higher rates of separation and divorce, and more unplanned pregnancies (Bruner et al., 2015; Minde et al., 2003; Murphy & Barkley, 1996). Likewise, partners of individuals with ADHD report significantly lower marital satisfaction than couples without ADHD (Ben-Naim et al., 2017). A robust literature finds a decrease in marital satisfaction across the transition to parenthood (e.g., see review by Kluwer, 2010). As couples

enter parenting and co-parenting responsibilities, greater demands are placed on their relationships (e.g., communication around childcare, change in roles) with a resultant increase in frequency and intensity of disagreements (Huss & Pollmann-Schult, 2020). Therefore, new parents with ADHD and their co-parents may experience higher levels of parenting stress during the first year of parenthood compared to families without ADHD.

Together, these parent and infant factors are hypothesized to be associated with parental distress among families with and without ADHD. We hypothesized that poorer sleep quality and fewer social supports for the parent as well as more difficult temperaments (e.g., greater negative affect) and poorer infant sleep would each contribute to greater parental distress. Given impairments associated with ADHD in adulthood, including in interpersonal relationships, we also hypothesized that parent ADHD would contribute to parental distress for both the parent with ADHD and their co-parenting partner. Finally, as these factors were expected to be exacerbated amongst parents affected by ADHD (themselves or their partner), as well as being important for parental distress, we hypothesized that prediction from presence or absence of parental ADHD would lessen once these variables were included together in our statistical models.

Methods

Participants

Biological parent pairs ($N=146$; 73 families) and their infants, 6 to 10 months old, were recruited from Western Pennsylvania for participation in the Pittsburgh ADHD Risk in Infancy Study (PARIS). This study enrolled families with infants at high and low familial risk for ADHD to longitudinally examine early predictors of childhood ADHD. High risk infants had at least one parent who met DSM-5 criteria for childhood ADHD with persistence into adulthood ($n=37$) and low risk infants had two parents without ADHD ($n=36$). Of the families with ADHD, 13 included a mother with ADHD, 28 included a father with ADHD, and 4 included 2 parents with ADHD. Both male and female infants were enrolled, and high- and low-risk offspring were group-matched on infant sex, race, and ethnicity. Families were excluded if the infant was born before 38 weeks of gestation, had a low birth weight (<5 lbs 8 oz), or was exposed to perinatal substances as determined by both mother and father report. Participant characteristics are shown in Table 1.

Procedures

All parents participated in a research visit, in-person, to determine ADHD status and co-morbid psychiatric disorders. Assessments were conducted by a masters or doctoral-level clinician, research-trained to evaluate symptoms and impairment of ADHD across the lifespan. Parents also completed questionnaires remotely using Qualtrics (Provo, UT) regarding their demographics, parenting stress, sleep, and their infant's behavior. All participants provided informed consent prior to participation. All families were compensated for their time and the study protocol was approved by the University of Pittsburgh IRB.

Measures

Parent ADHD. The Conners' Adult ADHD Diagnostic Interview (CAADID; Epstein et al., 2001) is a semi-structured interview to examine presence of ADHD in childhood and adulthood. Participants were identified as having ADHD (yes, no) if they met DSM-5 criteria for any presentation, 6+ symptoms in childhood and 5+ symptoms in adulthood with impairment across the lifespan.

Parenting distress. The Parent Distress subscale of the Parenting Stress Index-Short Form (PSI-4-SF; Abidin, 2012) contains 12 items and assesses distress related to perceived parenting competence, social support, and conflicts between parenting and other roles. Parents rate each item on a scale from 1 (strongly disagree) to 5 (strongly agree). The PSI contains two additional domains of parent stress: Parent-Child Dysfunctional Interaction and Difficult Child. Cronbach's alphas for all three scales in our sample were .89, .86, and .90, respectively. Raw scores from each scale can be converted into normed percentile scores, which can be used to determine if a parent's stress scores are in the clinically significant range (90th percentile or greater). The measure also includes a check for defensive responding.

Parent sleep. The General Sleep Disturbance Scale (GSDS; Lee, 1992) is a 21-item scale used to assess sleep problems. Parents rated the frequency of a number of different sleep problems on a scale from 0 (did not occur in the past week) to 7 (occurred every day in the past week). Responses to the 21 items are summed to yield a total score which generally range from 20 to 40 for good sleepers and in the 60s for shift workers (Lee, 1992); women typically score above 42 in the pregnancy and postpartum periods (Gay et al., 2004). Gay et al. (2004) reported internal consistencies of 0.77 for new mothers and 0.85 for new fathers. The Cronbach's alphas for our sample were .88 for mothers and .88 for fathers. A 3-item sleep quality subscale mean can also be calculated; a score above 3 on the Sleep Quality subscale indicates poor sleep quality three nights per week or more.

Parent depression. The Structured Clinical Interview for DSM-5 Research Version (SCID-5-RV; First et al., 2015) is a semi-structured interview guide used by the study

Table 1. Participant Demographics.

	High-risk (*N* = 73)	Low-risk (*N* = 72)
	M (*SD*)	*M* (*SD*)
Parent age (years)	32.9 (5.5)	32.7 (5.7)
Infant age (months)	8.8 (2.1)	8.4 (1.6)
	N (%)	*N* (%)
Parent race		
Asian	2 (2.7)	7 (9.7)
Black or African American	11 (15.1)	13 (18.1)
White or European American	58 (79.4)	51 (70.8)
More than one race	2 (2.7)	1 (1.4)
Parent ethnicity		
Hispanic or Latinx	5 (6.8)	3 (4.2)
Not Hispanic or Latinx	68 (93.2)	69 (95.8)
Parent education		
Partial high school	2 (2.7)	0 (0.0)
High school or GED	8 (11.0)	9 (12.5)
Technical/secretarial school	2 (2.7)	2 (2.8)
Partial college (>1 year)	7 (9.6)	8 (11.1)
Associate or 2-year degree	5 (6.8)	5 (6.9)
College or university graduate	23 (31.5)	23 (31.9)
Graduate or professional training	26 (35.6)	25 (34.7)
Parent relationship status		
Single, never married	19 (26.0)	8 (11.1)
Married	54 (74.0)	64 (88.9)

Note. High-Risk indicates the parent or co-parent has an ADHD diagnosis.

clinicians to determine the presence of a lifetime history of major depressive disorder (MDD) by DSM-5 symptom and impairment criteria, yes or no.

Social support. The Maternal Social Support Index (MSSI, Pascoe et al., 1981) is a 21-item questionnaire that asks about support with household chores and childrearing, frequency, and quality of contact with neighbors, family members, significant other, and friends, as well as involvement in organizations. Scores on the MSSI can range from 1 to 19. Although validated for use with mothers (Pascoe et al., 1981, 1982), there were no significant differences in overall report of social supports by fathers and mothers in our sample ($M_{fathers}$ = 14.15, SD = 2.53; $M_{mothers}$ = 14.22, SD = 2.81).

Infant sleep. The Brief Infant Sleep Questionnaire (BISQ; Sadeh, 2004) is a 10-item questionnaire completed by parents regarding their infant's sleep. Two items (How much time does your child spend in sleep during the NIGHT between 7 in the evening and 7 in the morning, and Average number of awakenings per night), have been found to discriminate between infants presenting clinically with sleep concerns and controls. Nighttime sleep and number of nighttime awakenings accounted for 45% of the variance between groups (clinical vs. control) and assignment to the correct group occurred 85% of the time based on these two items (Sadeh, 2004).

Infant temperament. The Infant Behavior Questionnaire—Revised Very Short Form (IBQ-R-VS; Putnam et al., 2014) is a 37-item questionnaire used to assess infant temperament. Parents rated how often their child exhibited a particular behavior in the past week on a 7-point scale (1 = Never, 7 = Always). The IBQ-R-VS has three subscales: (1) Surgency, which includes positive affect, activity level, and vocal reactivity; (2) Negative Affect, which includes sadness, distress to limitations, and fear; and (3) Effortful Control, which includes regulatory capacity, cuddliness, and soothability. Putnam reported alphas >.65 for all subscales; Cronbach's alphas in our sample were .79 for Surgency, .78 for Negative Affect, and .75 for Effortful Control.

Analytic Approach

Hypotheses were tested using a series of multilevel models clustered by family (both biological parents), with maximum likelihood estimation, to cross-sectionally examine predictors of parenting distress. All analyses were conducted in SPSS version 24 (IBM Corp, 2016). Covariates (parent

Table 2. Intercorrelations.

		1	2	3	4	5	6	7	8	9	10	11
1	Parent education	—										
2	Parent poor sleep quality	−.073	—									
3	Social support	.130	−.098	—								
4	Infant surgency	.101	.076	−.036	—							
5	Infant negative Affect	−.030	**.268****	−.012	**.341*****	—						
6	Infant effortful control	.075	.042	.064	**.375*****	.072	—					
7	Infant night sleep	**.364*****	**−.173***	**.240****	.130	.016	−.010	—				
8	Infant awakenings	−.078	.036	−.064	−.040	.115	−.026	**−.259****	—			
9	Parent distress	−.026	**.341*****	**−.274****	−.150	.023	**−.229****	−.136	−.045	—		
10	Parent/partner ADHD	−.010	**.199***	−.133	**.223****	**.171***	.110	−.150	.021	**.201***	—	
11	History of MDD	−.001	**.320*****	−.102	−.031	.048	.077	−.053	−.022	**.168***	**.247****	—

Note. Bold indicates statistical significance.
*$p < .05$. **$p < .01$. ***$p < .001$.

sex and education) were first entered into the model followed by parental ADHD. Parent and infant predictors were tested in separate models. In a final model, all predictors $p \leq .2$ were retained (Vittinghoff et al., 2012). Given the high comorbidity of adult ADHD and depression as well as the potential overlap between symptoms of depression and parental distress, we conducted additional analyses to determine if a history of depression explains a portion of the elevated risk for parental distress among families with ADHD.

Results

Table 2 shows the bivariate correlations amongst the study variables. Statistically significant associations were observed among some of the predictors (e.g., Infant Surgency and Effortful Control), but none of the associations were over .4, supporting their distinctiveness as hypothesized predictors. Descriptive statistics for all study variables are reported in Table 3. Additionally, families with and without ADHD were compared on all study variables. Parents in families with ADHD had worse sleep quality, greater parental distress, and more frequent lifetime history of MDD. Children born to parents with ADHD had greater surgency and negative affect. Forty-two parents met criteria for MDD across their lifetime with 29 (40%) among the high-risk parents and 13 (18%) among the low-risk parents. Fourteen parents scored in the high or clinically significant range for the Parent Distress scale of the PSI-4-SF (seven high-risk parents and seven low-risk parents; five fathers and nine mothers).

Parent ADHD in Relation to Parental Distress

Before testing associations with parent ADHD, an unconditional model was tested and found to have a significant ($p = .001$) random intercept clustering by family with an intraclass correlation (ICC) of .42; this supported the use of multilevel modeling. The next model examined the relation between parent ADHD and parental distress adjusting for parent sex and education, Table 4. This initial model showed that having an ADHD diagnosis or a partner with an ADHD diagnosis significantly predicted more parent distress in the first year of their infant's life ($t = 2.07$; $p = .04$; ES = 0.40). Neither parent sex nor parent education were significantly associated with parental distress.

Parent Factors in Relation to Parental Distress

Parent sleep quality and social supports were added to the main effect model of parent ADHD predicting parent distress, Table 4. Both parent sleep quality and social supports were significant predictors of parent distress such that poorer sleep quality ($t = 3.87$, $p < .001$, ES = 0.31) and fewer social supports ($t = -3.48$, $p < .001$, ES = 0.27) were associated with greater parent distress. In this model, family ADHD status was no longer significantly associated with parent distress.

Infant Factors in Relation to Parental Distress

In a separate model, infant factors (infant sleep and temperament) were added to the main effect model of parent ADHD predicting parent distress, Table 4. Greater infant surgency ($t = -2.23$, $p = .02$, ES = 0.21) and effortful control ($t = -2.57$, $p = .01$, ES = 0.22) predicted less parental distress. Family ADHD status remained a significant predictor of parental distress ($t = 2.38$, $p = .02$, ES = 0.49). Negative affect and infant sleep were not significantly associated with parent distress.

Table 3. Descriptive Statistics and Comparison Between High and Low-Risk Families.

	Mean	*SD*	Range	High-risk, *M* (*SD*)	Low-risk, *M* (*SD*)	*p*
PSI-4-SF: Parental Distress Raw Score	25.6	9.0	12–60	**27.4 (7.9)**	**23.8 (9.7)**	**.015**
PSI-4-SF: Parental Distress Percentile Score	47.5	27.6	3–99	**54.4 (24.4)**	**40.5 (29.0)**	**.002**
GSDS: Parent Sleep Quality Subscale	3.6	2.0	0–7	**4.0 (2.1)**	**3.2 (1.9)**	**.016**
Social supports	14.2	2.7	7–19	13.8 (2.7)	14.5 (2.6)	.111
IBQ-R-VS: Surgency Subscale	5.2	0.7	3.0–7.0	**5.3 (0.8)**	**5.1 (0.7)**	**.008**
IBQ-R-VS: Negative Affect Subscale	4.2	1.0	1.8–7.0	**4.3 (0.9)**	**4.0 (0.9)**	**.044**
IBQ-R-VS: Effortful Control Subscale	5.3	0.8	3.4–7.0	5.3 (0.8)	5.2 (0.8)	.199
Infant hours of nighttime sleep	9.2	2.1	1.5–12.0	8.9 (2.2)	9.5 (2.0)	.115
Infant number of nighttime awakenings	1.5	1.0	0-3	1.5 (1.00)	1.5 (1.0)	.803

Note. Higher GSDS Parent Sleep Quality scores indicate lower quality sleep.
Bold indicates statistically significant group differences at $p < .05$.

Table 4. Multilevel Models Predicting Parenting Distress.

	Unconditional model		ADHD only model		Parent factors model		Infant factors model		Full model	
	B	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*	*B*	*SE*
Intercept	0.000	0.099	0.232	0.149	0.110	0.152	0.336*	0.158	0.221	0.148
Parent education			0.052	0.084	0.087	0.082	0.118	0.086	0.117	0.076
Parent sex			−0.069	0.125	0.025	0.119	−0.156	0.124	−0.081	0.108
Parent or partner ADHD			0.400*	0.193	0.231	0.197	0.491*	0.207	0.355^{+}	0.194
Parent poor sleep quality					0.309***	0.075			0.303***	0.068
Social support					−0.267***	0.077			−0.248***	0.070
Infant hours of nighttime sleep							−0.091	0.090		
Infant night time awakenings							−0.080	0.092		
Infant surgency							−0.209*	0.091	−0.197*	0.078
Infant negative affect							0.054	0.086		
Infant effortful control							−0.221*	0.086	−0.206**	0.077
Residual variance	0.571***		0.555***		0.442***		0.464***		0.343***	
Intercept variance	0.421***		0.401**		0.421***		0.450***		0.435***	
Intraclass correlation	0.424		0.419		0.488		0.492		0.559	
Log likelihood	395.9		391.0		340.8		348.0		332.1	

$^{+}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

Full Model Predicting Parental Distress

In a final model, all predictors of parental distress with *p*-values <.2 from the prior models were included and tested simultaneously. Parental ADHD was marginally significant ($t = 1.83$, $p = .07$, ES = 0.36) and each of the remaining predictors that were previously significant remained so, Table 4. The ICC was 0.56, estimating that 56% of the total variance in parenting distress is explained by parent or partner ADHD status, parent sleep quality, social supports, infant surgency, and effortful control when clustering by family and adjusting for parent education and sex, up from 42% in the unconditional model.

Contribution of Lifetime Depression

Lifetime history of depression was a significant predictor of parental distress when examined with the covariates and parental ADHD only, $t = 2.48$; $p = .02$, and marginally significant in the full model, $t = 1.81$; $p = .07$, Table 5. Parental ADHD was no longer a significant predictor when lifetime history of depression was included in the model.

Discussion

The current study examined the relation between parent ADHD and parental distress in the first year postpartum.

Table 5. Multilevel Models Predicting Parenting Distress Accounting for Lifetime History of Depression.

	ADHD Only model		Full model	
	B	*SE*	*B*	*SE*
Intercept	0.522**	0.195	0.397*	0.178
Parent education	0.070	0.088	0.117	0.075
Parent sex	−0.024	0.128	−0.063	0.105
Parent or partner ADHD	0.325	0.213	0.303	0.198
Lifetime history of MDD	0.458*	0.185	0.288^{+}	0.159
Parent poor sleep quality			0.273***	0.069
Number of social supports			−0.248***	0.069
Infant Surgency			−0.174*	0.078
Infant effortful Control			−0.219**	0.076
Residual variance	0.521***		0.317***	
Intercept variance	0.487***		0.467***	
Intraclass correlation	0.483		0.596	
Log likelihood	361.7		317.5	

$^{+}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

This is one of the few studies of parents with ADHD and their infant offspring and it has several strengths including parents being well-characterized with ADHD and inclusion of both parents. The latter is particularly important as fathers have historically been under-represented in research on parenting (Lamb, 2000). Yet, research has demonstrated the importance of fathers and the co-parenting relationship on child development and behavior (Parkes et al., 2019; Sethna et al., 2017;). In studying two groups of parents—one that included at least one parent with ADHD and the other excluding parents with ADHD, we found evidence (at least at the group mean level) of greater distress reported by those affected by ADHD. This study also revealed that several parent and infant factors, above and beyond demographic characteristics, may be important for the experience of parenting-related distress among parents with ADHD or partnered to a parent with ADHD. Given the link between parenting stress and poor behavioral health outcomes for both parents and offspring, families affected by parental ADHD with infants may benefit from early interventions and/or support that address these factors during the transition to parenthood.

Our finding of greater average level of distress among the parents in families with ADHD was consistent with our prediction and expands understanding of family dynamics in the context of ADHD. In particular, presence of ADHD in either parent of an infant may represent a variety of difficulties in the home that elevate parenting-related stress and should be considered when attempting to understand the transmission of ADHD across generations. Importantly, this group difference disappeared when accounting for parental history of depression and suggests that this well-known comorbidity (e.g., Riglin et al., 2021) may create the initial vulnerability responsible for the parenting distress. Another possible contributor to our group-level finding may be the absence of treatment experienced in this sample. Few parents reported currently receiving medications for ADHD (19%, 7/37). Untreated ADHD, either pharmacologic or cognitive/behavioral, could be contributing to parent and partner distress through a variety of mechanisms including greater home chaos and less cohesion in co-parenting. These impairments likely result in higher levels of stress in daily activities of parenting. Our finding of no group differences at clinically significant levels of distress was unexpected and may be a function of the advanced level of education in our sample; future research should expand sampling to include more parents without college degrees. In addition, although the magnitude of distress differences may be modest, cumulative effects of chronic parenting distress over time need to be investigated.

Lower quality parent sleep was found to be associated with greater parental distress in the first year postpartum. Importantly, this result was observed after adjusting for parental demographic characteristics, ADHD, and other parent and infant factors (including parental depression history). Moreover, the association between parent ADHD and parent distress fell to non-significance after including parent sleep in the regression model, suggesting that part of the effect of parental ADHD on parent distress is explained by poor sleep quality amongst parents with, or partnered to someone with, ADHD. ADHD is commonly comorbid with sleep disturbances which likely result from a combination of physiological (e.g., delayed melatonin onset; Van Veen et al., 2010) and behavioral etiologies (e.g., nighttime media use and sleep hygiene; Martin et al., 2020). Sleep may worsen for adults with ADHD in early parenthood because of a heightened need for greater discipline around sleep routines and advanced planning for activities to be

accomplished after infant bedtime—each of which should be more difficult for parents with versus without ADHD. Indeed, our results found that, when examined cross-sectionally, parent sleep quality is associated with parental ADHD such that parents with ADHD or a partner with ADHD reported significantly worse sleep quality.

Sleep as a predictor of distress is consistent with similar results in the literature outside of ADHD. Increasing attention has been given to the impact of postpartum sleep disruption on parental well-being and the parenting experience. Studies have found that mothers with poorer sleep at 6 months postpartum have lower quality parenting and greater symptoms of depression across the first year of their infant's life (Bai et al., 2020; Saxbe et al., 2016). Saxbe et al. (2016) also found mother and father sleep quality to be correlated and, interestingly, that mothers' sleep quality predicted paternal depressive symptoms. This suggests that sleep disruption of one parent may be a conduit for parental distress among both parents. The transmission of poor sleep among couples is particularly relevant among families affected by ADHD given the high rates of sleep disturbances reported among individuals with ADHD (Fadeuilhe et al., 2021).

Parent social supports was associated with parental distress. However, it was not associated with high or low risk status of the parents. These findings may also have been influenced by the high proportion of well-educated parents in this sample and may not be representative of the general population of adults with ADHD. As such, we speculate that the parents with ADHD may have had greater supports than is typical for this population which may have contributed to their academic successes despite their ADHD symptoms. The observed social support levels in the sample supports this conjecture. Additionally, nearly all participants were from intact families (married or living with the infants' other parent) due to the study design requiring both parents to participate. Thus, it is possible that parents with ADHD may also benefit from the social network of the unaffected parent.

Support was found for the hypothesis that infant temperament would relate to parental distress, but our expectations about the associations between parental ADHD, infant temperament, and parental distress were not supported. Three infant temperament factors were studied, two were associated with parental ADHD (more surgency, more negative affect), but greater effortful control (regulatory capacity, cuddliness, and soothability) and surgency (activity level combined with positive affect and vocal reactivity) were each associated with *less* parental distress. These associations with distress were supported in the final model with all variables included as well as in the initial model excluding parent factors. The association between (more) effortful control and (less) parental distress was expected, but the inverse association between surgency and parenting distress was not expected, nor was the strengthening of the ADHD-parental distress association after including surgency in the model. Although speculative, infants in the high-risk families may be exhibiting a combination of temperament traits that include high activity levels and positive emotions. A recent literature review and meta-analysis found greater activity levels in infants to be associated with later development of childhood ADHD (Kostyrka-Allchorne et al., 2020) and other literature has supported early exuberance (happiness, positive emotions) to be associated with both inattentive and hyperactivity symptoms in childhood (e.g., Thorell et al., 2017). Lowered parental distress may stem from an increase in rewarding interactions experienced by parents of infants who frequently smile, coo, and wave their arms and legs with excitement. Replication of this finding is important to ensure that it is not idiosyncratic to this sample.

Our findings have some tentative clinical implications that would be strengthened by replication in larger samples. First and foremost, our finding that parental sleep related to both parental distress and parental risk group suggests that treating sleep disturbances, as well as the symptoms and impairments of ADHD that may interfere with sleep, may be beneficial for new parents with ADHD. ADHD symptoms may lead to poor sleep behaviors and result in poor sleep quality for both the parent with ADHD and their partners, as seen in this sample. Ultimately, such interventions may improve the overall physical and mental health of parents with ADHD, their partners, and infants at familial risk of developing ADHD.

Interestingly, our bivariate correlational analyses showed that families with greater social supports and higher parent education reported more nighttime hours of sleep for their infant. Research on postpartum sleep interventions has demonstrated that consultation with pediatric providers and behavioral-education can improve infant nighttime sleep including greater sleep duration and fewer awakenings (Hiscock & Wake, 2002; Stremler et al., 2006). Therefore, families with greater supports and education may more readily access resources (e.g., new parent support groups, infant sleep training books, social supports) for help with sleep training their infants. While infant hours of nighttime sleep was significantly associated with parent sleep quality in the bivariate correlations, the association was small in magnitude and infant sleep did not predict parent distress. Thus, sleep training for the infant alone may be insufficient for improving parent sleep quality and parenting distress. Additionally, infants' hours of nighttime sleep did not differ between families with and without parental ADHD.

Certain limitations of our research must be acknowledged. First, the study was cross-sectional and therefore we were unable to directly test mediational pathways unfolding longitudinally or rule out prospectively the existence of confounding variables in place prenatally. Additionally, the

absence of objective measurement of infant temperament and sleep leaves open the possibility that reporter effects are driving associations in this study. As mentioned earlier, the educational level of the participants is high with over half of families having a 4-year college degree or graduate degree (67%) and most (75%) identifying as White which may limit the generalizability of these findings to populations more distressed by fewer resources. Participants were primarily recruited through two mechanisms: (1) a university-hosted community research registry and (2) postcards mailed to women on a university hospital birth registry. Enrollment of families from the birth registry was limited to women with stable housing given the time between delivery and mailing of the postcards (4–9 months). Both recruitment methods likely contributed to the higher SES sample. Additionally, requiring both biological parents to be able and willing to participate resulted in a sample of heterosexual, largely co-parenting, couples, and eliminated most single-parent households that might be more prone to parenting distress (as well as same-sex couples). Lastly, the sample size prohibits separate examination of parents with ADHD and their partners as well as gender, sexual, racial, and ethnic identity differences that may be present. Our future work will examine longitudinal outcomes for these families and efforts are ongoing to recruit and retain more diverse participants.

Overall, the findings herein demonstrated that parents with ADHD and their partners experience greater mean-level parenting distress in the first year of their child's life than families without parental ADHD. This association is modest but should be examined for cumulative, long-term effects. Poor parental sleep quality was significantly associated with parental distress. Sleep disturbance is common among individuals with ADHD, and in this sample parents with ADHD and their partners reported poorer sleep quality than families without ADHD. Thus, treating sleep disturbances, as well as the symptoms and impairments of ADHD that may be disrupting sleep, are potential targets for new parents with ADHD. Ultimately, such interventions may improve the overall physical and mental health of parents with ADHD, their partners, and infants at familial risk of developing ADHD.

Declaration of Conflicting Interests

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