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Paternal ADHD symptoms and child conduct problems: is father involvement always beneficial?

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Abstract

Background Maternal psychopathology robustly predicts poor developmental and treatment outcomes for children with attention-deficit/hyperactivity disorder (ADHD). Despite the high heritability of ADHD, few studies have examined associations between paternal ADHD symptoms and child adjustment, and none have also considered degree of paternal involvement in childrearing. Identification of modifiable risk factors for child conduct problems is particularly important in this population given the serious adverse outcomes resulting from this comorbidity.

Methods This cross-sectional study examined the extent to which paternal involvement in childrearing moderated the association between paternal ADHD symptoms and child conduct problems among 37 children with ADHD and their biological fathers.

Results Neither paternal ADHD symptoms nor involvement was independently associated with child conduct problems. However, the interaction between paternal ADHD symptoms and involvement was significant, such that paternal ADHD symptoms were positively associated with child conduct problems only when fathers were highly involved in childrearing.

Conclusions The presence of adult ADHD symptoms may determine whether father involvement in childrearing has a positive or detrimental influence on comorbid child conduct problems.

Keywords
ADHD, conduct problems, involvement, parenting, paternal

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Introduction

In the United States, 3–7% of school-age children are diagnosed with attention-deficit/hyperactivity disorder (ADHD; American Psychiatric Association 2000). Children with ADHD display developmentally aberrant symptoms of hyperactivity, impulsivity, and/or inattention with associated functional impairment across important life areas (e.g. family conflict, academic difficulty, poor social relationships; Coie & Dodge 1998; Mikami & Pfiffner 2008). ADHD is also highly comorbid with conduct disorder (CD; 2.6–17.1%; Bird *et al.* 1994; Romano *et al.* 2005) and oppositional defiant disorder (ODD; 36.5–65%; Biederman *et al.* 1996; Yang *et al.* 2004). Indeed, the presence of comorbid CD/ODD symptoms (collectively referred to as 'conduct problems') substantially increases the risk for very serious outcomes including substance abuse and criminal behaviour (Henry *et al.* 1996; Lahey *et al.* 1998; Lynam 1998; Elkins *et al.* 2007; Harty *et al.* 2009). Thus, identifying risk factors for conduct problems among children with ADHD is a research priority.

Maternal psychopathology is a robust risk factor for child conduct problems among children with ADHD (Chronis *et al.* 2007), yet the impact of paternal psychopathology remains

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relatively understudied. Because ADHD is highly heritable (Faraone *et al.* 2005), parental ADHD symptoms has emerged as a focus of intervention and research. Adults with ADHD experience the same core symptoms of inattention and hyperactivity/impulsivity as children (Faraone *et al.* 2000), and these symptoms profoundly impact parenting ability (Johnston *et al.* 2012). Specifically, parents with ADHD often display impulsive decision-making, emotional reactivity, reduced vigilance, and poor planning. Indeed, among families of children with ADHD, mothers and fathers with elevated ADHD symptoms themselves display more laxness, inconsistent discipline, poor parental monitoring, over reactivity, and coerciveness (Arnold *et al.* 1997; Harvey *et al.* 2003; Murray & Johnston 2006; Chronis-Tuscano *et al.* 2008; Rogers *et al.* 2009). Paternal childhood ADHD is also associated with child conduct problems in this population (Chronis *et al.* 2003); however, no studies have examined the relationship between paternal ADHD and child conduct problems.

Developmental research has identified paternal involvement as an important predictor of child psychosocial outcomes. For example, early involvement by both residential and non-residential fathers predicts lower levels of adolescent conduct problems and police contact (Flouri & Buchanan 2002; Coley & Medeiros 2007). Within families of children with ADHD, having a biological father present in the home is related to lower levels of child conduct problems (Pfiffner *et al.* 2001).

What remains unclear, however, is the impact of paternal involvement on child behaviour when fathers have psychopathology (e.g. ADHD). Considering that fathers of children with ADHD often report maladaptive involvement with their children (Arnold *et al.* 1997; Harvey *et al.* 2003; Rogers *et al.* 2009) and are 4–5 times more likely to have ADHD themselves (Chronis *et al.* 2003), research is needed to understand the relations between paternal ADHD symptoms, paternal involvement, and child conduct problems. To our knowledge, the current study is the first to examine whether paternal involvement moderates the relationship between paternal ADHD symptoms and concurrent child conduct problems.

Method

Participants

The current study sample ($n = 37$) was recruited from a larger sample of mothers who participated in three prior studies conducted in our laboratory ($n = 195$; Raggi *et al.* 2009; Chronis-Tuscano *et al.* 2011, 2013). Mothers were originally recruited via mailings to local ADHD groups, schools, and health providers in the Washington, DC metropolitan area. Across these original studies, children met *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association 1994) ADHD criteria, were between the ages of 6–12 years old, and had an estimated IQ of at least 70. Mothers who agreed to be informed of future research opportunities were recontacted to obtain permission to contact the child's father to elicit his participation in the current study. Because ADHD is highly heritable (Faraone *et al.* 2005; Thapar *et al.* 2007), we included only biological fathers. Also, because parents of children with ADHD are more likely to be divorced or unmarried (Wymbs *et al.* 2008), we made considerable attempts to recruit non-residential biological fathers (see Fig. 1 for a complete consort diagram).

Families who participated in the current study had a higher mean family income ($t(202) = -2.19$, $P < 0.05$) and fewer non-residential fathers ($\chi^2(1, n = 202) = 10.26$, $P < 0.01$) than the larger sample from which we recruited. However, no differences between the full sample and this subsample emerged for maternal education, child conduct problems, and percentage of fathers with a history of psychiatric diagnosis or treatment. Considerable variability was observed in child conduct problems (i.e. 48.6% of children with ODD and 8.1% with CD) and paternal ADHD (i.e. 24% of fathers with childhood ADHD and 13% with adult ADHD). Additionally, our sample shows considerable racial/ethnic diversity. Sample characteristics are presented in Table 1.

Procedure

Measures of child psychopathology and impairment were completed by mothers and teachers at the time of their participation in the original studies. During the current study, measures of paternal psychopathology and involvement were completed by fathers via mailed questionnaires and a structured telephone interview (Fig. 1). Considering the difficulty of including fathers in clinical research (Phares 1992), a very brief battery of measures was selected, and no travel to the university was required (Mitchell *et al.* 2007). Fathers were compensated $25 for completing questionnaires and $25 for completing the telephone interview.

Materials

Child ADHD diagnosis and conduct problems

A comprehensive child ADHD assessment was conducted (Pelham *et al.* 2005), and the presence of an ADHD diagnosis

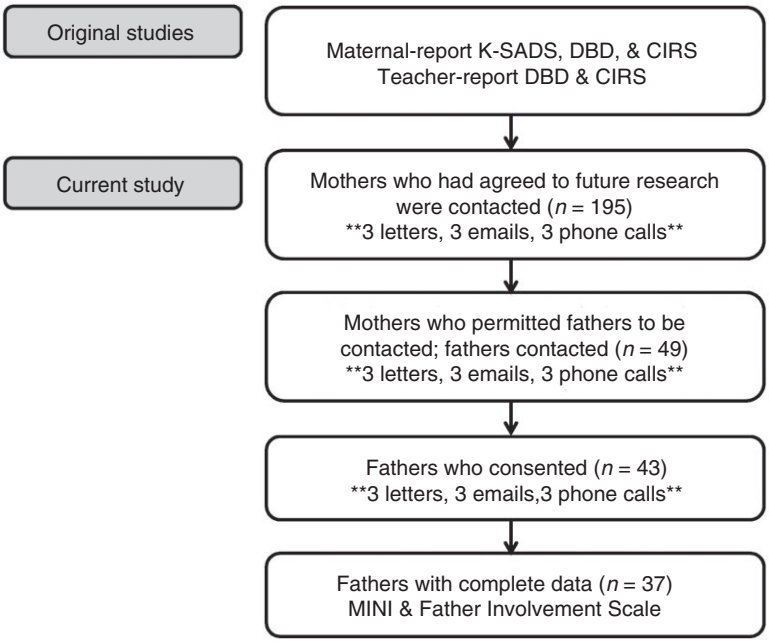

Figure 1. Consort diagram. CIRS, Children's Impairment Rating Scale; DBD, Disruptive Behavior Disorders Scale; K-SADS, Schedule for Affective Disorders for School-Aged Children; MINI, Mini International Neuropsychiatric Interview.

was required for inclusion in the original studies. ADHD symptoms were considered present if endorsed as clinically significant by the mother on the Schedule for Affective Disorders for School-Aged Children-Present and Lifetime Version (K-SADS-PL; Kaufman *et al.* 1997) or Disruptive Behavior Disorders checklist (DBD; Pelham *et al.* 1992), or the teacher on the DBD. The parent-reported DBD demonstrated good internal consistency ($\alpha = 0.89$). Diagnostic reliability on the K-SADS has been reported elsewhere for these samples (0.85–0.86; Raggi *et al.* 2009; Chronis-Tuscano *et al.* 2011, 2013). The Children's Impairment Rating Scale (CIRS; Fabiano *et al.* 2006) was also completed by both mothers and teachers in order to establish the presence of cross-situational impairment, a requirement for a DSM-IV diagnosis and for inclusion in these studies (APA 2000).

To measure conduct problems, symptoms of ODD and CD were considered present if endorsed as clinically significant by the mother on the K-SADS or DBD, or the teacher on the DBD. Conduct problems were examined continuously in the current study.

Paternal ADHD symptoms

Fathers were administered the Mini International Neuropsychiatric Interview (MINI Plus; Sheehan *et al.* 1998) by telephone to assess for symptoms of ADHD (childhood and adulthood), antisocial personality disorder, alcohol dependence, and non-alcohol substance dependence (all measured continuously). The MINI was selected for its strong psychometric properties, including concordance with the Structured Clinical Interview for DSM-IV (SCID; First *et al.* 1996; Sheehan *et al.* 1998) and brief administration time. Telephone administration of diagnostic interviews is supported by prior studies (Sobin *et al.* 1993; Rohde *et al.* 1997) and was preferable in the current study in order to minimize participant burden.

Paternal involvement

During the current study, fathers also completed the engagement/activities section of the Early Head Start Father Interview (Cabrera *et al.* 2004), to measure the frequency with which they performed specific activities with the target child in the past month (e.g. 'Played outside in the yard, a park, or a playground with him/her?'). We modified the original measure by removing items that were not relevant to children ages 6–12 and adding items addressing essential activities for children with ADHD (e.g. 'Attended a parent-teacher conference at his/her school?', 'Took him/her to the doctor?'). Good internal consistency has been observed for both the original measure ($\alpha = 0.77$–0.86; Cabrera *et al.* 2004) and our modified version ($\alpha = 0.93$), the latter of which also shows convergent validity with the Alabama Parenting Questionnaire Involvement subscale ($r = 0.62$; Shelton *et al.* 1996). Scores were entered as a

Table 1. Sample demographic and diagnostic characteristics ($n = 37$)

Child demographic variables		
Age		8.29 (2.00)
Gender		
Male	26 (70.3%)	
Female	11 (29.7%)	
Ethnic characteristics		
White	23 (62.2%)	
African American	5 (13.5%)	
Hispanic or Latino	1 (2.7%)	
Biracial	7 (19.4%)	
Child clinical characteristics (K-SADS/DBD)		
ODD diagnosis	18 (48.6%)	
CD diagnosis	3 (8.1%)	
Conduct problems		4.59 (2.95)
Maternal demographic variables		
Age		41.03 (5.83)
Total family income		$126 897.87 ($67 159.07) Range = $22 000–$300 000
Highest level of education (years post middle school; proxy for SES)		7.70 (3.09)
Paternal demographic variables		
Age		42.94 (7.19)
Residential status		
Residential	33 (89.2)	
Non-residential	4 (10.8)	
Paternal clinical characteristics (MINI)		
ADHD (childhood diagnosis)	9 (24.3)	
ADHD (adulthood diagnosis)	5 (13.5)	
Depression (lifetime diagnosis)	5 (13.5)	
Alcohol dependence (lifetime diagnosis)	12 (32.4)	
Substance dependence (lifetime diagnosis)	5 (13.5)	
ASPD (lifetime diagnosis)	1 (2.7)	
Any psychiatric disorder (lifetime diagnosis)	19 (51.4)	

Results presented as M (SD) or as percent (*n*).
ADHD, attention-deficit/hyperactivity disorder; CD, conduct disorder; DBD, Disruptive Behavior Disorders Scale; DSM-IV, Diagnostic and Statistical Manual; Fourth Edition; K-SADS, Schedule for Affective Disorders for School-Aged Children; MINI, Mini International Neuropsychiatric Interview; ODD, oppositional defiant disorder; SES, socio-economic status.

frequency count (i.e. number of times fathers participated in each activity, summed across items) and examined continuously.

Results

Prior to the main analyses, relationships between all study variables were examined (Table 2). Significant correlations suggested that fathers of minority children and those with higher levels of past alcohol dependence were less involved in caregiving, whereas those with higher income levels were more involved. Interestingly, no significant correlations emerged between fathers' level of involvement and continuous ADHD symptoms, substance dependence, or antisocial problems. Next, child and parent demographic variables (see Table 1) were entered into two separate preliminary regression analyses predicting child conduct problems. No demographic variables were significantly associated with child conduct problems.

A series of linear regression analyses were conducted to examine the extent to which father involvement moderated the relationship between paternal ADHD symptoms and child conduct problems. On the first step of these analyses, father involvement and paternal ADHD symptoms (both examined continuously) were entered simultaneously. In the second step, we examined whether the interaction between paternal ADHD symptoms and involvement explained variance in child conduct problems above and beyond the first step. Analyses were completed separately for paternal childhood ADHD symptoms and paternal adulthood ADHD symptoms.

Neither paternal ADHD symptoms nor paternal involvement were independently associated with child conduct problems. However, paternal involvement moderated the relationship between paternal ADHD symptoms and child conduct problems (Table 3). Specifically, the interaction terms accounted for 11.9% and 20.1% of the variance in child conduct problems for

Table 2. Correlation matrix of independent, dependent, moderator and demographic variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Child age	–	−0.05	0.17	−0.02	−0.28	0.00	0.21	0.04	−0.01	−0.11	−0.20	0.10	−0.13	0.17	−0.07	−0.17	0.11
2. Child gender		–	0.14	−0.02	−0.08	−0.00	0.15	0.25	−0.06	−0.02	−0.06	−0.23	−0.15	−0.26	−0.14	0.19	0.05
3. Child minority status			–	−0.14	0.12	−0.15	0.11	−0.22	0.03	−0.02	0.06	0.05	−0.16	0.04	0.08	−0.43**	−0.12
4. Child ADHD medication status				–	0.05	0.08	−0.28	0.09	−0.09	−0.21	−0.06	−0.28	0.05	−0.18	−0.14	0.27	−0.07
5. Child conduct problems					–	−0.09	0.12	0.00	0.04	0.18	−0.01	−0.12	−0.03	−0.05	−0.12	0.03	−0.16
6. Father age						–	−0.17	0.42*	−0.05	0.03	−0.17	−0.05	−0.12	−0.22	−0.23	0.15	0.79**
7. Father residential status							–	0.00	0.28	−0.33*	0.21	0.26	0.25	−0.37*	0.06	−0.02	−0.23
8. Total household income								–	−0.13	−0.10	0.03	−0.11	−0.03	−0.15	−0.21	0.52**	0.55**
9. Father ADHD (childhood)									–	0.87**	0.45**	0.24	0.32	0.31*	0.53**	−0.19	−0.20
10. Father ADHD (adulthood)										–	0.47**	0.37*	0.44**	0.31*	0.47**	−0.12	−0.19
11. Father alcohol dependence (past)											–	0.47**	0.79**	0.07	0.52**	−0.13	−0.24
12. Father alcohol dependence (current)												–	0.56**	−0.01	0.31	−0.45**	−0.15
13. Father substance dependence (past)													–	0.23	0.48**	−0.19	−0.16
14. Father depression (lifetime diagnosis)														–	0.13	−0.06	−0.18
15. Father ASPD (lifetime)															–	−0.26	−0.25
16. Father involvement																–	0.19
17. Maternal age																	–

*$P < 0.05$, **$P < 0.01$.

Results reported as Pearson product-moment correlations or Kendall's tau as appropriate. Psychopathology variables refer to continuous symptoms unless otherwise noted.
ADHD, attention-deficit/hyperactivity disorder; ASPD, antisocial personality disorder.

Table 3. Paternal ADHD symptoms and paternal involvement predicting child conduct problems

	d.f.	*F*	R^2	$R^2\Delta$	SE	β
Step 1	2, 33	0.022	0.001	0.001		
Childhood ADHD					0.185	0.027
Involvement					0.025	0.030
Step 2	1, 32	2.581	0.195	0.194**		
Childhood ADHD × involvement					0.007	1.554**
Step 1	2, 33	0.503	0.030	0.030		
Adulthood ADHD					0.164	0.171
Involvement					0.024	0.046
Step 2	1, 32	3.935	0.269	0.240**		
Adulthood ADHD × involvement					0.006	1.744**

*$P < 0.05$, **$P < 0.01$.
ADHD, attention-deficit/hyperactivity disorder.

childhood and adulthood ADHD symptoms, respectively. No other form of paternal psychopathology or their interactions with father involvement were significant.

To examine the two-way interactions, the effect of paternal ADHD symptoms on child conduct problems was examined when father involvement was low (−1 SD) and high (+1 SD) (Aiken & West 1991). When father involvement was low, paternal ADHD symptoms were *not* significantly related to child conduct problems ($P = 0.21$ for childhood ADHD and $P = 0.41$ for adult ADHD). However, in the presence of high father involvement, paternal ADHD symptoms were significantly positively related to child conduct problems ($P = 0.04$ and $P = 0.004$ for childhood and adulthood ADHD symptoms, respectively; Fig. 2).

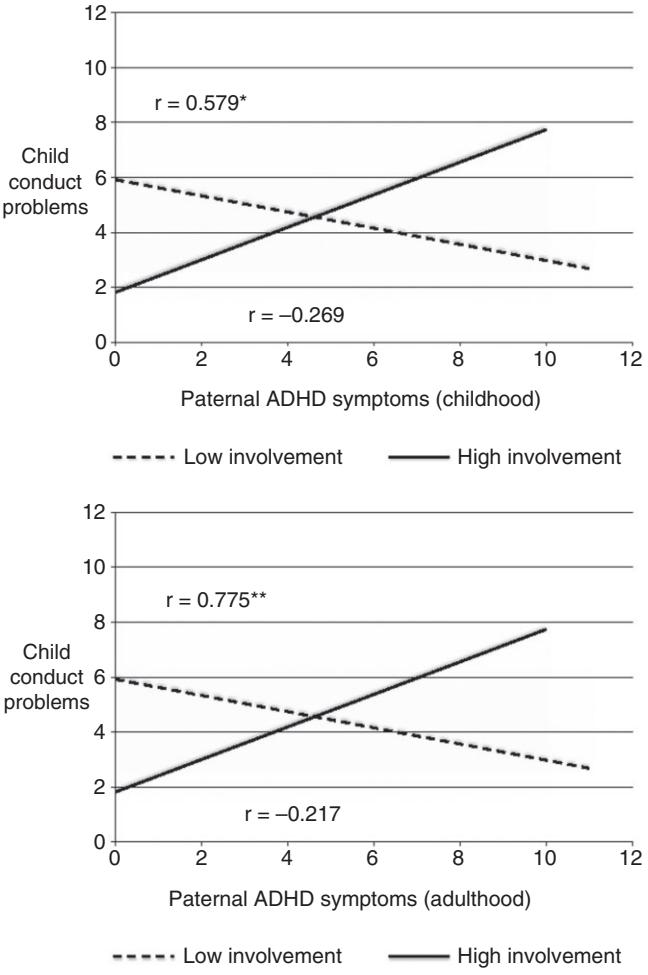

Figure 2. Interaction of paternal ADHD symptoms and paternal involvement predicting child conduct problems (based on median split). *$P < 0.05$, **$P < 0.01$. ADHD, attention-deficit/hyperactivity disorder.

Discussion

This cross-sectional study extends the growing literature on associations between paternal ADHD symptoms and child conduct problems by considering level of paternal involvement as a potential moderator. Indeed, among fathers with higher levels of involvement, paternal ADHD symptoms were positively associated with child conduct problems; yet, among fathers with lower levels of involvement, there was no significant relationship. This finding represents an interesting exception to the general finding within the developmental psychology literature that higher levels of paternal involvement relate to *better* psychosocial outcomes in children (Flouri & Buchanan 2002; Coley & Medeiros 2007). It is likely that the relation between paternal involvement and child behaviour depends on paternal mental health, in this case paternal ADHD symptoms.

The results of this study should be considered in light of its limitations. First, fathers are extraordinarily difficult to recruit for participation in research (Addis & Mahalik 2003; Mitchell *et al*. 2007), and this is compounded in clinical samples (Pfiffner

et al. 2001; Cassano *et al.* 2006). As a result, this study was limited by a small and potentially select sample. Non-residential fathers comprised only 10.8% of the sample, which was lower than both that of the larger sample from which we recruited (38%) and what would be expected within families of children with ADHD (Wymbs *et al.* 2008). Additionally, our subsample had a significantly higher mean income level than the larger sample from which we recruited. These sample characteristics may limit the generalizability of our findings to the broader population of families of children with ADHD. Future studies should recruit larger samples that are more representative of the ADHD population, perhaps through community-based establishments or using Internet-based data collection.

A second important limitation concerns the timing of variable measurement. This study was cross-sectional in nature. Additionally, because this was an add-on study, child conduct problems were assessed at the time families participated in the original studies, prior to the measurement of paternal psychopathology and involvement. As a result, we cannot assume that paternal ADHD symptoms and involvement pre-dated child conduct problems (Mash & Dozois 2003). Future longitudinal studies may clarify whether high levels of both paternal ADHD symptoms and involvement is a potential risk factor for the development of later conduct problems among children with ADHD.

Third, the manner in which fathers were recruited was limited in our study. We required mothers' permission to contact fathers, and prior research has found that mothers often function as 'gatekeepers' to protect fathers' time (Mitchell *et al.* 2007). Phone calls to elicit participation and complete phone interviews were also made by a female investigator. Future studies which employ face-to-face visits and involve male research assistants in contacting fathers may be more successful, as these procedures have been found to be considerably more effective for recruiting fathers, regardless of income-level and residential-status (Mitchell *et al.* 2007). These limitations aside, this study was unique in that we collected direct reports from fathers about their ADHD symptoms, which is recommended but rarely obtained in this literature (Pfiffner *et al.* 2001).

Finally, future studies should consider the *quality* of father involvement, rather than simply the *frequency* of father involvement in various childrearing activities. It is likely that maladaptive parenting is the mechanism by which involvement by fathers with elevated ADHD symptoms have children with higher levels of conduct problems (Arnold *et al.* 1997). For instance, paternal inattention may impact fathers' ability to monitor and maintain consistency, whereas impulsivity may promote harsh and emotionally reactive discipline, two aspects of parenting which have been associated with child conduct problems (Pfiffner *et al.* 2005). Future research should therefore seek to more fully understand the extent to which paternal parenting underlies the current study finding.

Despite these limitations, this study is among the very first to consider both paternal ADHD and paternal involvement in relation to child conduct problems, and its results preliminarily suggest that paternal psychological health may determine whether father involvement in childrearing has a positive or detrimental influence on child conduct problems. As such, this study addresses a general lack of research related to fathers and specifically emphasizes the importance of examining modifiable risk factors, especially paternal involvement, among families of children with ADHD in order to prevent the escalation of problems in this population. We hope that our provocative findings will stimulate larger studies on this topic.

Within a clinical context, these findings suggest the importance of routinely assessing paternal ADHD and involvement as one component of child ADHD assessment. Moreover, it may be especially important to engage highly involved fathers with elevated ADHD symptoms in treatment (Fabiano 2007). Indeed, maternal ADHD symptoms have been shown to be associated with diminished treatment effects for children with ADHD (Sonuga-Barke *et al.* 2002; Chronis-Tuscano *et al.* 2011). Thus, researchers and clinicians should consider integrating treatment for maternal and paternal ADHD symptoms, when present, as one component of comprehensive treatment for their children (Chronis-Tuscano & Stein 2012; Johnston *et al.* 2012).

Key messages

- The impact of father involvement on child development may be complicated by the presence of paternal psychopathology, specifically adult ADHD symptoms.
- As with mothers, high levels of ADHD symptoms in fathers may be associated with related impairments in the quality of parenting.
- Though mothers are traditionally the primary point of contact for child ADHD interventions, clinicians should attempt to engage fathers of children with ADHD.

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