Scientific Research Publishing

Health, 2017, 9, 1054-1074
http://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

The Effects of Parental ADHD Symptoms on Parenting Behaviors

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How to cite this paper: Friedrich, A., Moning, J., Weiss, J. and Schlarb, A.A. (2017) The Effects of Parental ADHD Symptoms on Parenting Behaviors. *Health*, **9**, 1054-1074.
https://doi.org/10.4236/health.2017.97077

Received: May 16, 2017
Accepted: July 14, 2017
Published: July 17, 2017

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Abstract

Adults suffering from attention-deficit/hyperactivity-disorder (ADHD) often display high levels of inattention, hyperactivity and impulsivity. These symptoms might interfere with skills that are necessary for optimal parenting such as consequent and emotionally responsive behavior towards the child. Therefore, the present review aims at investigating how parental ADHD symptoms influence parenting, thereby including specific parental behaviors of both effective behavior control and emotional responsiveness. In order to identify eligible studies, a systematic search was conducted. Studies were included in this review if at least some of the investigated parents suffered from ADHD or heightened ADHD symptoms, and if the studies focused on specific parenting behaviors as outcome measures. 14 studies yielded the inclusion criteria. Across studies, parental ADHD symptoms were negatively associated with consistent discipline, parental involvement and positive parenting, and positively associated with lax and over-reactive parenting, intrusiveness and negative emotions. The core symptom of inattention had stronger negative effects on parenting than impulsivity and hyperactivity. Across studies, the gender of parents had inconsistent effects. All in all, the present review shows that parental ADHD is associated with serious impairments in parenting. Therefore, parents with ADHD should be specially addressed and trained in the context of children ADHD treatment.

Keywords

Parental ADHD, Parenting, Maternal ADHD

1. Introduction

The effects of attention-deficit/hyperactivity-disorder (ADHD) in adults on their parenting have long been neglected in psychological research [1]. However, it is

estimated that around 4% of adults suffer from this disorder [2], that ADHD persists from childhood into adulthood in 50% - 80% of the cases [3], and that 40% - 55% of the ADHD-affected children have at least one parent with ADHD [4] [5]. In a study with 79 ADHD-affected children, 41.3% of the mothers and 51% of the fathers suffered from ADHD [6]. Even so, only a rather small number of adults receive treatment for their ADHD [7]. Similar to child ADHD, adult ADHD includes the core symptoms of excessive inattention and hyperactivity/impulsivity. However, symptoms differ. For example, hyperactivity is experienced as restlessness rather than acted out [8]. Furthermore, the diagnosis of ADHD in adults is biased by retrospective assessments and current functioning [8]. Various researchers agree that elevated ADHD symptoms lead to an increased functional impairment in everyday life, independent of exceeding a diagnostic threshold [9].

One domain of functioning which is affected by ADHD symptoms is parenting behavior [1]. Referring to the fundamental paper of Darling and Steinberg [10], Johnston and colleagues defined parenting behavior as consisting of two dimensions: Effective behavioral control and emotional responsiveness. Effective behavioral control encompasses behaviors directing or protecting the child such as setting clear rules and being consequent. Emotional responsiveness includes behaviors that express warmth, sensitivity and approval towards the child.

Johnston and colleagues reviewed a great number of studies investigating the effects of parental ADHD symptoms on parenting behavior [1]. ADHD symptoms were associated with impairments in effective behavioral control. To begin with, higher parental ADHD symptoms correlated positively with family disorganization and less monitoring of the child's behavior. Moreover, parents with heightened ADHD symptoms displayed more inconsistency and over-reactivity. This pattern of results persisted even if confounding variables such as child ADHD symptoms were controlled [1].

However, the association between parental ADHD symptoms and emotional responsiveness appeared to be less consistent across studies. While some studies did not find any associations between ADHD symptoms and emotional responsiveness, other authors observed an impaired emotional responsiveness when ADHD symptoms were heightened. Despite, other studies showed that heightened ADHD symptoms led to parents being more emotionally responsive [1]. Johnston and colleagues also suggested that the core symptoms of ADHD (inattention, hyperactivity, impulsivity) might have different influences on parenting, with inattention leading to more parenting difficulties. Furthermore, they concluded that the link between parenting impairments and ADHD symptoms did not depend on whether the latter were assessed continuously or diagnostically.

Beyond, previous studies had some methodical issues. First, they mostly focused on mothers and school-aged sons while not investigating fathers and daughters. Second, various studies relied on self-report measures of ADHD symptoms and parenting, which possibly impaired reliability. Third, the role of the gender of parent and child had not been systematically examined [1].

2. Objectives

The present review focuses on parental ADHD symptoms affecting parenting behavior. More precisely, the present review examines how specific parenting behaviors of both effective behavioral control and emotional responsiveness are influenced by ADHD symptoms. We want to

- investigate the effects of maternal as well as paternal ADHD symptoms,
- examine the distinct role of the core deficits of ADHD and
- examine the implemented methods of assessment besides self-report.

3. Method

3.1. Inclusion Criteria

Cross-sectional or longitudinal studies were included in the present review, while case analyses were excluded. The participants investigated in eligible studies were parents and mostly their own children. A study met the inclusion criteria if at least some of the investigated parents either had an ADHD diagnosis or displayed a higher degree of ADHD symptoms. Furthermore, the age of the parents and their children was not restricted except for children being younger than 18 years. Children were not allowed to have any other disorder than attention-deficit/hyperactivity disorder or oppositional defiant disorder (ODD). The sample size was not restrained to a specific number of participants. Moreover, studies were included if they examined specific parenting behaviors, strategies or parenting styles. In order to receive some earlier as well as recent studies, the publication date was restricted from January, 2007, to April, 2017.

3.2. Search Strategy

A systematic search of the databases PSYNDEX, PsycINFO, PsycARTICLES and MEDLINE was conducted from March 1, 2017, to May 2, 2017. The keywords "parenting ADHD OR maternal inattention OR parents ADHD children OR maternal ADHD OR parental ADHD OR paternal ADHD OR paternal inattention" were used. All searches were conducted in English.

3.3. Screening and Data Extraction

Duplicate articles were removed prior to screening. Screening and data extraction were undertaken by two reviewers with the same keywords. First, titles and records were screened to identify eligible articles. Then the full-text articles were assessed and included within the review if they met all inclusion criteria mentioned above. Potential risk of bias of these full-text articles was estimated using the *Cochrane Collaboration's tool for assessing risk of bias* [11]. All eligible articles should investigate the effects of parental ADHD symptoms on parenting. Therefore, the outcome measures were defined as parenting behaviors, including specific control and emotionally responsive behaviors. Regarding missing data, a study was excluded from the review if a potentially relevant record was screened but the full-text article was not available. Also, studies not reporting a sufficient

number of demographic data were excluded from the review.

4. Results

The systematic search of the databases yielded 708 studies after removing duplicate articles. Fourteen of these met the inclusion criteria and were hence included within the review. Figure 1 presents a flow chart of the review process, which was conducted according to the *Preferred Reporting Items for Systematic Reviews and Meta Analyses* (*PRISMA*) guidelines [12].

4.1. Included Studies

The demographic data, method, outcome measures and limitations of the included studies can be seen in Table 1. Most of the studies were conducted and published in the USA, and a great range of children's age was covered across the studies. Furthermore, most studies focused on the effects of maternal ADHD symptoms on the parenting of the mothers' own child, while some studies assessed the effects of parental ADHD symptoms on both mothers' and fathers' parenting. Therefore, the present review focuses on describing effects of maternal ADHD on parenting first, then turning to effects of both maternal and paternal ADHD symptoms. Some studies also investigated other outcome measures than parenting. However, due to the research question of the present review, the description of the studies only focuses on their results related to parenting.

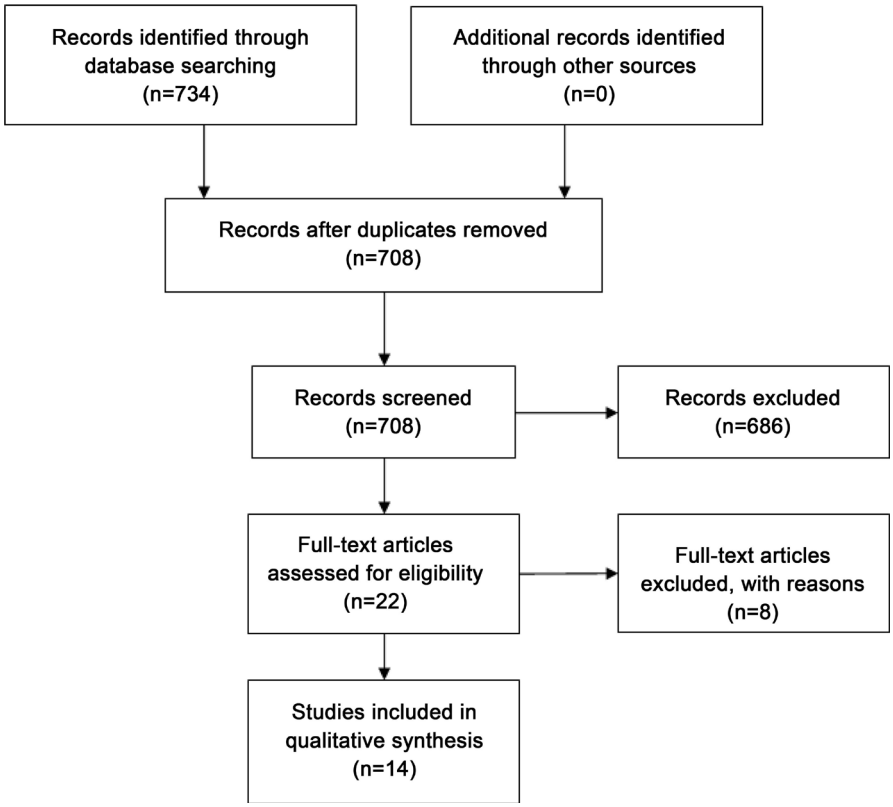

Figure 1. Flow chart of the review process according to the PRISMA guidelines.

Table 1. Characteristics of included studies.

Publ. design	Participants: Parents N % fem	Parents age M (SD)	Parents Assessment of ADHD[1]	Children N % fem	Children age M (SD)	Children ADHD symptoms/ diagnosis	method	outcomes	limitations
Studies with mothers									
[13] (USA) 100% cross-sectional study	147	45.32 (5.45) CA: 44.27 (5.88) MCA: 46.57 (6.44)	25.17% > clinical cut-off (MCA) categorically	COMP: 9.4% CA: 7.02% MCA: 13.51%	COMP: 16 (2.09) yrs CA: 15.16 (2.07) yrs MCA: 17.30 (1.38) yrs	COMP: 0% CA: 100% (with 81.62% ODD/CD diagnosis) MCA: 100% (with 82.86% ODD/CD diagnosis)	**Mothers:** CBQ, BDI, PSWQ, SCID-NP, Parenting Scale **Children:** DBD, DSM-III-R, DSM-IV	- Compared to CA, MCA reported more parent-adolescent conflict, less parental knowledge, monitoring, and consistent discipline, and more ineffective discipline. No differences emerged regarding effective discipline and involvement.	- only mothers - only self-ratings - childhood history of ADHD was not necessary
[14] (Canada) 100% Cross sectional study	80	32.27 (7.28)	54% > clinical cut-off continuously	N/A	R = 3 - 6 yrs	N/A	**Mothers:** ABCA, CAARS, BSI, PSOC, PLOC, PS **Children:** CPRS	- high ADHD group scored significantly lower on parenting efficacy and significantly higher on parenting dissatisfaction compared to low ADHD group - high ADHD group scored higher on negative parental efficacy, belief in fate/chance, and parental lack of control compared to the low ADHD group - no differences between the groups on parental responsibility or child control - high ADHD group scored significantly higher on laxness and over-reactivity	- only self-reports - women in low ADHD group reported having a diagnosis of ADHD - effect of stimulants on parenting was not examined - only middle- to high-income families - participants were assigned to groups based on ADHD symptoms without considering the impairment in functioning
[15] (Canada) 100% cross-sectional study	96	36.47 (5.91)	0% > clinical cut-off continuously	96 0%	70.10 mths (14.27)	10% ADHD diagnosis	**Mothers:** CSS, CAARS, PS, APQ, observational coding system, Brief Symptom Inventory **Children:** SDQ	- maternal inattention was positively associated with inconsistent discipline - maternal inattention was negatively associated with maternal involvement - impulsivity was negatively associated with the use of positive reinforcement - hyperactivity was not associated with any outcome measure	- only self-reports - mothers had minor difficulties with inattention and impulsivity - only mothers and sons
[16] (USA) 100% cross-sectional study	70	38.6 (6.1)	17% > clinical cut-off continuously and categorically	70 29%	8.06 (1.2) yrs	100% ADHD 48% comorbid ODD	**Mothers:** SCID, K-SADS, CAARS, BDI-II, APQ observational: 5-min free play and 10 min homework task DPICS **Children:** DBD symptom checklist, K-SADS, CIRS, WISC-IV	- continuous assessment (similar to categorical assessment) - self-reported maternal ADHD symptoms were negatively associated with maternal involvement, positive parenting and consistent discipline - maternal ADHD symptoms were positively related to observed negative parenting and repeated commands - maternal ADHD symptoms were negatively related to observed positive parenting	- sample size was limited - mothers had a continuous range of ADHD symptoms rather than formal ADHD diagnoses - functional impairment in mothers was not fully assessed - only mothers

Continued

[17](USA) Prospective longitudinal study (3 yrs)	234 100%	41.86 (6.21)	7% > clinical cut-off continuously	234 43%	**T1:** 9 - 12 yrs **T2:** 12.07 (0.9) yrs **T3:** 13.06 (0.9) yrs **T4:** 14 (0.9) yrs	3.4% ADHD 3% CD 4.8% ODD symptoms	**Mothers:** CAARS, DERS, CES-D **Children:** CCNES-AP, DBD	- maternal ADHD symptoms were positively correlated with harsh parenting and maternal distress and negatively associated with positive parenting response to adolescents' negative emotion - maternal difficulties with emotion regulation mediated only the relation between maternal ADHD symptoms and maternal harsh parenting	- only mothers - only maternal self-report
[18] (England) cross-sectional study	1: 95 100% 2: 192 100%	1 & 2: N/A	1: 6.25% > clinical cut-off continuously Study 2: 13.14% > clinical cut-off continuously	1: 95 33% 2: 192 42%	1: 7.61 (2.58) yrs Study 2: Group 1: ? yrs (N = 150) Group 2: 3 yrs (N = 42)	Study 1: 29% ADHD boys 9.4% ADHD girls symptoms Study 2: 87.9% ADHD boys 75.7% ADHD girls symptoms	**Mothers 1:** AARS, GHQ, APQ **Children 1:** SDQ **Mothers 2:** Maternal EE: The Preschool Five Minute Speech Sample **Children 2:** WWP, observed mother-child interaction with Behavior Checklist	- parents with ADHD showed more positive parenting if the child also had ADHD in both studies (similarity-fit hypothesis) - child ADHD symptoms were associated with more negative comments of the parents (Study 2) - in general, parental ADHD symptoms were related to more negative EE of the parents (Study 2)	- only self-reports - no parenting of fathers was examined - no parents with a clinical diagnosis of ADHD, so that the range of severity of symptoms was narrower for mothers than for children
[19] (Canada) cross-sectional study	40 100%	31.6 (?)	12.5% > clinical cut-off continuously	40 35 % 	6.2 (1.4) mths	Too young for a diagnosis	**Mothers:** ABCA, BSI, QRPCI **Children:** IBQ	- maternal inattention was uniquely and significantly negatively associated with maternal sensitivity and positively with intrusiveness and negative regard - hyperactivity/impulsivity were not uniquely associated with any of the outcome measures	- small sample size - lack of clinically diagnosed sample - possible under sampling of mothers with impulsive symptoms - researcher's presence might have influenced the mother-infant interactions - high social status
[20] (Canada) cross-sectional study	99 100%	33 (4.23)	7% slightly above average level continuously	99 65%	6 mth (11 days)	Too young for a diagnosis	**Mothers:** BIQ, CAARS, PSOC, PACOTIS, SSQ6, BSI-18 **Children:** IBQ	- maternal ADHD symptoms did not predict maternal self-efficacy - maternal ADHD symptoms predicted lower parenting satisfaction and perceived parental impact - maternal ADHD symptoms predicted hostile-reactive behaviors only for "difficult infants"	- only mothers - mostly high social economic status - low levels of maternal ADHD symptoms - only self-report - underestimation of the contribution of ADHD symptoms possible due to the co-occurrence of other psychological disorders

Continued

Studies with both parents									
[21] (Canada) cross-sectional study	1: 96 100 % 2: 48 two-parent fam.	1: 40.74 (6.11) 2: 39.31 (6.54)	1: 10% > clinical cut-off 2: 15% > inattentive clinical cut-off 17% > hyperactive/ impulsive clinical cut-off continuously	1: 96 0% 2: 48 25%	1: 9.97 (1.17) yrs 2: 8.13 (1.47) yrs	1: 44% ADHD 2: 100% ADHD	**Mothers Study 1:** APQ, Responsiveness Coding System, CSS, BSI **Children Study 1:** SDQ, ADHD Rating Scale **Parents Study 2:** CAARS, ASR **Children Study 2:** CPRSR-S, ADHD Rating Scale-IV	Study 1: - more hyperactive/impulsive symptoms in mothers were associated with more positive self-views of positive parenting, above and beyond observations of positive parenting. Study 2: - more hyperactive/impulsive symptoms in parents were associated with more positive self-views of positive parenting, above and beyond observations of positive parenting - inattentive symptoms did not affect over-estimation of positive parenting.	- no clinical diagnosis (parents) - observational measure and self-report were tapping aspects of parenting that are related differently to ADHD symptoms - only positive parenting was investigated
[22] (USA) cross-sectional study	460 68 %	N/A	3% mothers and 2% fathers reached the clinical cut-off for ADHD continuously	319 55%	7 yrs (N = 213) 10 yrs (N = 106)	N/A	**Parents:** Adult ADHD Rating Scale-IV, CHAOS, APQ, CCNES **Children:** ADHD Rating Scale-IV: School Version	- for mothers home chaos was linked to the presence of ADHD symptoms in any family member - for fathers, only own ADHD symptoms were related to home chaos - significant relations between maternal ADHD symptoms and inconsistent discipline and non-supportive responses to child negative emotions - paternal ADHD symptoms significantly related to inconsistent discipline, involvement, and both supportive and non-supportive responses to child negative emotions - home chaos mediated the association between fathers' ADHD symptoms and involvement	- only self-reports - shared method variance due to parents offering information about their ADHD symptoms, parenting and perceived home chaos
[23] (England) cross-sectional study	312 89 %	N/A	School sample[2]: M_f = 8.07 (5.91) M_m = 7.29 (5.38) ADHD support group[4]: M_f = 15.50 (13.40) M_m = 11.0 (10.16) continuously	312 (?)	mother: girls 7.57 (2.25) boys 8.27 (2.07) father: girls 8.07 (2.30) boys 7.90 (2.61) both: girls 7.07 (2.30) boys 8.22 (2.90)	School sample[4]: Mothers: 14.02 (10.04) Fathers: 12.06 (7.61) ADHD support group[4]: Mothers: 42.52 (7.91) Fathers: 41.45 (8.06)	**Parents:** AARS, GHQ, AQ, APQ **Children:** ADHD Rating Scale, SDQ	- mothers with ADHD showed more positive parenting if the child also had ADHD (similarity-fit hypothesis) - fathers with ADHD showed more negative parenting if the child also had ADHD (similarity-misfit hypothesis) - sign neg. association between maternal ADHD symptoms and positive involved parenting - for fathers, no sign. effect with PIP was found	- only self-reports - parenting reports could be influenced by systematic personal biases associated with factors such as expectations and attributions about child difficult behavior - sample of fathers smaller than that of mothers

Continued

[24] (USA) longitudinal study (2 yrs)	120 90 %	N/A	49.4% > clinical cut-off continuously	120 33%	T1: 5 - 10 yrs T2: 7 - 12 yrs	50.5% ADHD diagnosis	**Parents:** ASRS, BDI, APQ, DPICS **Children:** ADHD and ODD from DISC (Shaffer *et al.*, 2000)	- parental ADHD symptoms were associated with more corporal punishment and marginally related to inconsistent discipline and positive parenting behavior - corporal punishment (marginally), observed praise and observed negative talk each uniquely predicted child ADHD symptoms - corporal punishment significantly and independently mediated the prospective association between parent and child ADHD	- 90% mothers - child and parental ADHD measured with self-report and interview - participants recruited from unspecified sources (clinical or community settings), the generalizability of findings to specific populations is unknown
[25] (USA) cross-sectional study	179 two-parent fam. Mothers: 41.96 (5.27) Fathers: 44.17 (6.02)		6% mothers > clinical cutoff 11% fathers > clinical cut-off continuously	179 0%	9.69 yrs (1.9)	70% ADHD diagnosis	**Parents:** BAARS, APQ, PS, CRD, BSI **Children:** ADHD Rating Scale-IV, CBCL/6-18	maternal parenting - interaction of maternal and paternal inattentive symptoms predicted negative parenting - interaction of maternal and paternal hyperactivity/ impulsivity predicted negative parenting paternal parenting - paternal inattentive symptoms uniquely predicted negative parenting - interaction of maternal and paternal hyperactivity/ impulsivity predicted negative parenting	- focus on dyadic interactions instead of triadic interactions - increased risk of α errors - parental self-report of ADHD symptoms - only male children - use of measures that compounded two aspects of negative parenting - limited assessment of comorbidity
[26] (USA) cross-sectional study	90 two-parent fam. mothers: 40 (?) fathers: 42 (?)		5% > clinical cut-off continuously	90 16%	10.77 yrs (?)	56.67% ADHD diagnosis	**Parents:** CSS, BDI-II, PSOC-S, DAS-S, FOS → interaction with confederate children	- parental ADHD symptoms were uniquely correlated with observer-coded negative parenting - significant interaction of parental inattentive symptoms and confederate behavior on partner-rated negative parenting - no significant interaction of parental hyperactive/impulsive symptoms and confederate behavior on any outcome measure - no effect of parent gender	- few parents with clinical ADHD symptoms - self-report of parental ADHD symptoms - confederates' inattention, hyperactivity /impulsivity and ODD and their impact on parenting were not examined - only families with high socio-economic status - few parent couples including two adults with ADHD symptoms - observers were not blind to child's confederate behavior status - no assessment of ADHD history treatment

Note. [1]Analyses could be conducted continuously and/or categorically. [2]Possible ADHD score ranges from 0 to 54. AARS = Adult ADHD Rating Scale; ABCA = ADHD Behavior Checklist for Adults; APQ = Alabama Parenting Questionnaire; AQ = Aggression Questionnaire; ASRS = Adult ADHD Self Report Scale; BAARS = Barkley Adult ADHD Rating Scale; BDI-II = Beck Depression Inventory-Second Edition; BSI = Brief Symptom Inventory; CAARS = Conners' adult ADHD rating scale; CBCL/6-18 = Child Behavior Checklist for Ages 6 - 18; CCNES-AP = Coping with Children's Negative Emotions Scale-Adolescent Version; CES-D = Center for Epidemiological Studies - Depression Scale; CHAOS = Confusion, Hubbub, and Order Scale; CIRS = Children's Impairment Rating Scale; CPRS = Conners Parent Rating Scale; CRD = Child-Rearing Disagreements Scale; CSS = Current Symptom Scale-Self Report Form; DAS-S = Dyad Adjustment Scale; DBD = Disruptive Behavior Disorders; DERS = Difficulties in Emotion Regulation Scale; DISC = Diagnostic Interview Schedule for Children; DPICS = Dyadic Parent-Child Interaction Coding System; FOS = Family Observation Schedule; GHQ = General Health Questionnaire; IBQ = Infant Behavior Questionnaire; K-SADS = Schedule for Affective Disorders for School-Aged Children; PLOC = Parental Locus of Control Scale; PS = Parenting Scale; PSOC = Parenting Sense of Competence Scale; QRPCI = Qualitative Ratings for Parent-Child Interaction at 3 - 15 months of age; SCID = Structured Clinical Interview for the DSM-IV; SDQ = Strength and Difficulties Questionnaire; WISC-IV = Wechsler Intelligence Scale for Children-Fourth Edition; WWP = Werry-Weiss-Peters Hyperactivity Scale.

The included studies were clustered into four categories: Studies that examined general maternal ADHD symptoms, studies that differentiated between the core symptoms of maternal ADHD, studies that examined general parental ADHD symptoms and studies that differentiated between the core symptoms of parental ADHD.

4.1.1. The Influence of General Maternal ADHD Symptoms on Parenting

Babinski and colleagues compared ADHD-affected mothers of ADHD-affected adolescents (MCA) to healthy mothers of ADHD-affected adolescents (CA) [13]. The results revealed that the MCA group reported more parent-adolescent conflicts, less parental knowledge, less monitoring, less consistent discipline and more ineffective discipline. No differences were found for effective discipline and involvement.

Furthermore, Banks, Ninowski, Mash and Semple assessed mothers ADHD symptoms and, based on these, divided them into a high and low ADHD group [14]. The high ADHD group had significantly more parenting dissatisfaction, negative parenting efficacy, belief in fate/chance and parent lack of control, laxness and over-reactivity. Additionally, the high ADHD group scored lower on parenting efficacy. No difference concerning parental responsibility and child control could be found between the two groups.

Chronis-Tuscano and colleagues [16] divided the mothers into a group with clinical ADHD (17%) and a non-ADHD group. Maternal ADHD symptoms were negatively associated with self-reported maternal involvement, positive parenting and consistent discipline.

In their three-year prospective longitudinal study, Mazursky-Horowitz and colleagues examined whether emotion regulation was a mediator between maternal ADHD symptoms and parenting [17]. They defined parenting as the mother's responses to their adolescent's expressions of negative emotions and differentiated between three parental responses: positive parenting response (including problem focused responses, emotion focused responses and expressing encouragement), harsh parental response (including punitive and minimization responses) and distress response. Maternal difficulties with emotion regulation mediated only the relation between maternal ADHD symptoms and maternal harsh parenting. Furthermore, maternal ADHD symptoms were significantly related to all three types of parenting responses to adolescent's expression of negative emotion.

Furthermore, Psychogiou, Daley, Thompson and Sonuga-Barke [18] conducted two studies examining the influence of maternal ADHD symptoms on parenting: the similarity-fit hypothesis, which predicts that a similarity of mother and child would improve parenting, and the similarity-misfit hypothesis, which predicts the opposite. The results of both studies supported the similarity-fit hypothesis. In their first study, a significant interaction between the effects of maternal and child ADHD symptoms on positive involved parenting were found: Mothers with high ADHD symptoms displayed more positive parenting when child ADHD symptoms also were high, compared to when child ADHD

symptoms were low. However, mothers with low symptoms displayed more positive parenting when child ADHD symptoms also were low. In the second study, a significant interaction of the same direction between the effects of maternal and child ADHD symptoms on affectionate and constructive parenting was found. Furthermore, a significant positive association between maternal ADHD symptoms and negative expressed emotion was revealed.

Finally, Watkins and Mash [20] investigated the effects of maternal ADHD symptoms on self-reported maternal self-efficacy, parenting satisfaction, perceived parental impact and hostile reactive behaviors towards their infant. Maternal ADHD symptoms predicted lower ratings of parenting satisfaction and perceived parental impact. However, maternal self-efficacy was not predicted by maternal ADHD symptoms. Beyond, child temperament moderated the influence of maternal ADHD symptoms on maternal hostile-reactive behaviors.

4.1.2. The Influence of Maternal Inattention, Hyperactivity and Impulsivity on Parenting

First, Chen and Johnston investigated the influence of the core symptoms (inattention, hyperactivity, impulsivity) of maternal ADHD on parenting separately [15]. After controlling for confounding variables, maternal inattention symptoms were positively associated with maternal inconsistent discipline and negatively associated with maternal involvement. Impulsivity was only uniquely negatively associated with use of positive reinforcement. Hyperactivity was not associated with any outcome measure.

Then, Semple, Mash, Ninowski and Benzies [19] differentiated between the core symptoms of inattention and hyperactivity/impulsivity, and assessed maternal behaviors (maternal sensitivity, intrusiveness and negative regard) with questionnaires and structured observation. The children were aged 3.75 to 8.75 months. After controlling for confounding variables, maternal inattention was uniquely and significantly negatively associated with maternal sensitivity and positively with intrusiveness and negative regard. However, hyperactivity/impulsivity were not uniquely associated with any outcome measure.

4.1.3. The Influence of General Parental ADHD Symptoms on Parenting

As mentioned above, some studies investigated the effects of both maternal and paternal ADHD symptoms on parenting. First, Mokrova, O'Brien, Calkins and Keane [22] examined whether home chaos was a mediator between parental ADHD and parenting. According to the mothers, their own ADHD symptoms, the child's ADHD symptoms and the father's ADHD symptoms contributed significantly to home chaos. According to the fathers, only their own ADHD symptoms were related to home chaos. Moreover, maternal ADHD symptoms were significantly positively associated with inconsistent discipline and non-supportive responses to child's negative emotions. Paternal ADHD symptoms were significantly positively associated with inconsistent discipline and non-supportive responses to child's negative emotions. Paternal ADHD symptoms were also significantly negatively linked to involvement and supportive res-

ponses to child's negative emotions. Home chaos mediated the association between paternal ADHD, involvement and inconsistent discipline.

Psychogiou, Daley, Thompson and Sonuga-Barke [23] found that a low number of maternal ADHD symptoms increased negative parenting when child ADHD was high. When maternal ADHD was severe, negative parenting decreased slightly when child ADHD also was severe. Fathers with severe ADHD symptoms used more negative parenting when their child also had severe ADHD symptoms.

Finally, Tung, Brammer, Li and Lee [24] examined parental ADHD symptoms as a key risk for offspring ADHD in a two-year longitudinal study. The results displayed a significant positive association between parental ADHD symptoms and corporal punishment. Also, parental ADHD was marginally positively associated with inconsistent discipline, and negatively with positive parenting behavior. Praise, negative talk and corporal punishment were significantly positively related with offspring ADHD symptoms after two years. Corporal punishment significantly and independently mediated the influence of parental ADHD symptoms on offspring ADHD symptoms after two years.

4.1.4. The Influence of Parental Inattention, Hyperactivity and Impulsivity on Parenting

Some studies investigated the effects of parental ADHD symptoms on parenting separately for the core symptoms. Lui and colleagues [21] examined in two studies whether parental ADHD symptoms were associated with self-reports of more positive parenting. In the first study, only mothers were tested, and in the second study, the same hypothesis was examined for 48 two-parent families. Both studies revealed similar results: the more hyperactive/impulsive symptoms parents displayed, the more positive self-views of parenting were reported, above and beyond observations of positive parenting. Parental inattentive symptoms did not affect over-estimation of positive parenting.

Second, Williamson and colleagues [25] examined the effects of parental self-reported ADHD core symptoms on the parenting of their male, partly ADHD-affected children. Maternal inattention affected parenting only negatively if paternal inattention also was high. However, when paternal inattention was low, no effect of maternal inattention existed. Also, maternal parenting was only negatively influenced when maternal hyperactivity/impulsivity was low and paternal hyperactivity/impulsivity was high. However, for mothers with high hyperactive/impulsive symptoms no relation between their negative parenting and paternal hyperactive/impulsive symptoms existed. Relating to fathers, inattentive symptoms were significantly positively associated with negative parenting while no interaction effect of fathers' and mothers' inattentive symptoms on fathers' parenting could be found. The same interactive effect of fathers' and mothers' hyperactive/inattentive symptoms on fathers' parenting as on mothers' parenting was revealed.

Finally, Wymbs, Wymbs and Dawson [26] examined the effects of self-reported ADHD symptoms of parents, whose children partly suffered from ADHD, on

the interaction with confederate children displaying either ADHD/ODD-like or typical behavior. The authors demonstrated that parental ADHD symptoms were only uniquely correlated with observer-coded negative parenting when confederate child behavior was controlled for. Parents with more inattentive symptoms interacted more negatively with confederates displaying ADHD/ODD-like behavior than with typical confederates. However, this pattern of results did not exist for parents with heightened hyperactivity/impulsivity symptoms. Moreover, no effect of parent gender could be found.

4.2. Risk of Bias in the Included Studies

Table 2 presents the risk of bias in the included studies. This risk was assessed using the *Cochrane Collaboration's tool for assessing risk of bias* [11]. The risks of missing *sequence generation*, *allocation concealment* and *blinding of outcome assessment* did not apply to the studies included within the present review since no interventions were assessed. The category "other bias" covered further limitations such as risk of social desirability. The most common limitations were the focus on maternal ADHD symptoms and self-reports as the only source of parental ADHD symptoms. Further limitations are listed more precisely in Table 1.

Table 2. Risk of bias of included studies.

Publications	Sequence generation	Allocation sequence concealed	Blinding of participants and personnel	Blinding of outcome assessment	Incomplete outcome data	Selective outcome reporting	Other bias
Studies with mothers							
12	-	-	H	-	L	L	H
13	-	-	H	-	L	L	H
14	-	-	L	-	L	L	H
15	-	-	L	-	L	L	H
16	-	-	H	-	L	L	H
22	-	-	H	-	L	L	H
17	-	-	U	-	L	L	H
18	-	-	U	-	L	L	H
19	-	-	H	-	L	L	H
Studies with both parents							
20	-	-	L	-	L	L	H
21	-	-	H	-	L	L	H
23	-	-	L	-	L	L	H
24	-	-	U	-	L	L	H
25	-	-	H	-	L	L	H

Note: - = does not apply to study; L = low risk of bias; H = high risk of bias; U = unclear/unknown risk of bias.

4.3. Excluded Studies

Table 3 (Supplemental) presents the studies which were excluded from the review after assessing the full text article. These studies were mainly excluded because they did not focus on parenting behaviors or children suffered from other disorders than ADHD.

5. Discussion

5.1. Main Results of the Review

The systematic search of four databases yielded fourteen studies meeting the inclusion criteria. Out of these, eight studies investigated the effects of maternal ADHD symptoms on parenting, while six assessed the effects of both maternal and paternal ADHD symptoms. Across studies it was shown that maternal ADHD symptoms were negatively associated with consistent discipline, maternal involvement and positive parenting, and positively associated with lax and over-reactive parenting, intrusiveness and negative regard. Also, mothers with high ADHD symptoms displayed higher parenting dissatisfaction and expressed more negative emotions. Furthermore, studies investigating the core symptoms of ADHD separately demonstrated that especially a heightened inattention was positively associated with more parenting problems, whereas heightened impulsivity and hyperactivity were rarely or not at all associated with parenting problems.

It was also examined if parenting improves if both children and mothers/fathers suffered from severe ADHD symptoms (similarity-fit hypothesis) or if it impairs (similarity-misfit hypothesis). A parental gender difference was found: a similarity-fit existed for mothers, whereas a similarity-misfit existed for fathers.

Other studies investigating both maternal and paternal ADHD effects on parenting revealed similar results to those reported in studies which focused on maternal ADHD symptoms. Moreover, some of these studies revealed gender differences, while others did not. In those reporting gender differences, fathers' parenting impairments were mostly associated with their own ADHD symptoms, whereas mothers reported that both their own, children's and fathers' ADHD symptoms were related to their negative parenting behaviors. It was also shown that mothers' and fathers' ADHD symptoms may exert an interactive effect on each parent's parenting.

5.2. Completeness and Quality of Evidence

Not all the studies investigating the effects of parental ADHD symptoms on parenting behavior were included within the present review. This is partly because the period of publication was restricted to the last ten years (2007-2017). Moreover, some studies were not available in full text form and others did not mainly focus on parenting behaviors and were therefore excluded from the review. Furthermore, the search of studies was only conducted in English, possibly not taking studies of other languages into account.

The quality of evidence of the reported studies' results can be estimated as low to moderate according to the GRADE approach [27], since all of these are cross-sectional and longitudinal and therefore observational studies. However, the quality of results regarding the effects of mothers' ADHD symptoms on parenting is underscored by both earlier and more recent studies finding similar associations of ADHD and parenting. Nevertheless, the results regarding the influence of parent gender remain still inconsistent as a couple of studies found gender effects while another did not. Also, the results are limited to some extent because the parents were not clinically diagnosed with ADHD in some studies. It is possible that the results would have been different if all included studies compared clinically ADHD affected to non-ADHD affected parents. Furthermore, the results of the studies might be biased due to often assessing maternal ADHD symptoms by self-report, which might have led to a reporting bias or social desirability. Moreover, the included studies investigated families with a high or middle socioeconomic status which questions the generalizability of the findings to families of lower socioeconomic status. Also, observers of mother/parents-child-interactions were not always blinded to the ADHD-status of the parents and the hypotheses of the study.

5.3. Integration into Previous Research

The present review demonstrates that parental ADHD symptoms are related to various impairments in parents' effective behavioral control such as family disorganization and less parental involvement which is in line with the review of Johnston and colleagues [1]. Furthermore, the results regarding the effects of parental ADHD on emotional responsiveness mainly correspond to those of Johnston and colleagues. While many parenting behaviors were negatively affected by parent ADHD symptoms, positive effects occurred only in the studies of Psychogiou and colleagues, if both mothers and children displayed severe ADHD symptoms.

Another important result of the current review was the differentiation between the three ADHD core symptoms: While the core symptom of inattention was strongly associated with parenting behaviors, the other two core symptoms impulsivity and hyperactivity only had a small influence on negative parenting.

Chen and Johnston postulate that inattentive parents experience more stress in their daily lives, because they exhibit a higher level of disorganization and forgetfulness [15]. In order to avoid additional stress caused by parent-child conflicts, inattentive parents give in more easily, thereby employing more inconsistent discipline. Furthermore, Chen and Johnston indicate that inattentive parents have less resources to cope with their children, leading to less parental involvement and less positive parent-child interaction [15]. According to Semple, Mash, Ninowski and Benzies [19], inattentive parents often miss the more subtle hints that express their children' needs, resulting in less parental sensitivity, higher parental intrusiveness, and more negative regard. Wymbs, Wymbs and Dawson summarize the detrimental effect of parental inattention by stating that

inattentive parents tend to ignore contextual factors and that they have more difficulties with predicting (and preventing) undesirable child behavior [26].

Reasons for the lack of an association between symptoms of parental hyperactivity/impulsivity and negative parenting are harder to find. Chen and Johnston [15] argument that parents are able to compensate or suppress hyperactive behavior. Another reason might be that hyperactive parents have more energy and might by this behavior compensate the negative aspect [21]. Finally, Lui and colleagues hypothesize that parental impulsivity extends to all parenting behaviors, which means that impulsive parents also express more spontaneous positive parenting (eg praising their child) [21].

All in all, the reasons for the different effects of parental ADHD core symptoms on parenting remain sparse. More research is needed to provide empirically sound argumentation.

Beyond, in the present review we aimed to encounter some methodical issues. First, it tried to examine the effects of both paternal as well as maternal ADHD symptoms on parenting. Although some studies regarding paternal ADHD were included, the heterogeneous results impair interpretation of the differences between mothers and fathers with ADHD. Recent studies used more observational methods to assess parenting behavior. The importance of the more objective methods of investigation is emphasized by the results of Lui und colleagues [21]. These revealed that parents with severe ADHD symptoms tend to overestimate their positive parenting behavior. The fact that parenting behaviors were more negatively scored by observers if ADHD was high, emphasizes the negative association of ADHD and parenting and heightens the generalizability of the findings compared to self-reports. Also, the review aimed at including studies that separated the core symptoms of ADHD. In line with Johnston and colleagues, maternal inattention was more strongly related to parenting impairments than hyperactivity and impulsivity. The present review could further demonstrate that this was partly also the case if both maternal and paternal core symptoms were separately accounted for. Furthermore, it was demonstrated that maternal and paternal core symptoms may interact to impair each parent's parenting.

Given the severe parenting impairments revealed in the present review and the coincident occurrence of ADHD in both child and parents of one family [4], it may be of high importance to develop parent trainings meeting the special difficulties of ADHD-affected parents. In line with this assumption, Chronis and colleagues [28] reported that negative parenting can impair the development of ADHD-affected children, and Chronis-Tuscano and colleagues [29] demonstrated that stimulant medication improved the ADHD symptoms of adults but not the parenting of their offspring. Additionally, it was shown that ADHD-affected parents responded poorly to traditional short-term parent training not achieving to reduce their negative parenting and repeated commands [30].

5.4. Limitations and Strengths of the Studies

Not all potentially relevant studies could be included within the review. General

methodological flaws included social desirability of parental reports, the lack of causal designs and ethnic diversity, and the retrospective assessment of parental ADHD symptoms.

However, it was achieved to integrate the findings of both rather early and recent studies which relied on observational methods of measuring parenting. Also, a great range of children's age was covered across the included studies. It was shown that parental ADHD symptoms affect the parenting of infants and school-aged children as well as that of adolescents.

6. Conclusion

Most studies revealed that maternal ADHD symptoms were consistently related to severe parenting impairments, whereby the core symptom of inattention led to more parenting difficulties than impulsivity/hyperactivity. Only six studies investigated the effects of fathers' ADHD symptoms on their parenting, also revealing impairments but inconsistent gender differences compared to mothers. Therefore, the effects of paternal ADHD symptoms on parenting and the differences compared to maternal ADHD should be investigated more precisely in future studies. Furthermore, regarding the severe ADHD-induced parenting impairments revealed in the present review, and the negative effects of parenting impairments on ADHD-affected children reported by other authors, it is important to support ADHD-affected parents by offering parent trainings adjusted to their specific difficulties. In general, investigating which specific parenting behaviors are impaired by parental ADHD could encourage the development of parent trainings that meet the special needs of ADHD-affected parents. One possibility of better supporting parents to improve their negative parenting might be interventions that combine both cognitive behavioral therapy and parent training [31].

Conflict of Interest

There is no conflict of interest.

Sources of Support

We acknowledge support for the Article Processing Charge by the Deutsche Forschungsgemeinschaft and the Open Access Publication Fund of Bielefeld University.

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Table 3. Characteristics of excluded studies.

Publ.	Participants						Reasons for exclusion
	Parents			Children			
	N % fem	age M (SD)	Assessment of ADHD	N % fem	age M (SD)	ADHD diagnosis (%)	
[32] (England)	N = ? 546 mothers 280 fathers	N/A	29% > clinical cut-off continuously	570 f = 15.4%	10.78 yrs (3.01)	100% diagnosis	no parenting, only family environment and child clinical presentation
[33] (USA)	258 two-parent families	N/A	f = 12% m = 6% > clinical cut-off continuously	258 f = 46.5%	44.13 mth (3.39)	21% ADHD 13% ODD 23% ADHD and ODD diagnosis	parenting was investigated only as a mediator
[34] (USA)	N/A	N/A	N/A	181 control (N = 52) f = 40.4%, inattentive (N = 24): f = 54.2%, hyperactive/ impulsive (N = 71): f = 25.4% not specified (N = 34) f = ?	control: 9.50 yrs (1.2), ADHD-PI [6]: 9.57 yrs (1.2) ADHD-C: 9.51 yrs (1.2) ADHD-NOS: ?	13.3% inattentive 39.2% hyperactive / impulsive 18.8% not specified	too many missing data of parents parental ADHD was not the primary focus focus on parenting and child ADHD
[35] (USA)	103 100 %	38.98 (5.81)	9.7% > clinical cut-off continuously	103 28 %	R = 6 - 10 yrs	47% ADHD diagnosis	focus on interpersonal relationships mother / child, child / peers, parenting was only marginally assessed

Continued

[36] (USA)	230 families Wave 1: 86 % Wave 2: 87 % Wave 3: 89 %	N/A	Wave 1: 37% Wave 2: 29% Wave 3: 24% > clinical cut-off continuously	Wave 1: ADHD (N = 116) f = 25.86% Non-ADHD (N = 108) f = 38.9% Wave 2: ADHD (N = 105) f = 36.67% Non-ADHD (N = 92) f = 38.04% Wave 3: ADHD (N = 85) f = 23.53% Non-ADHD (N = 73) f = 42.47%	Wave 1: ADHD 7.23 yrs (1.14) Non-ADHD 7.51 yrs (1.08) Wave 2: ADHD 10.11 yrs (1.31) Non-ADHD 10.29 yrs (1.28) Wave 3: ADHD 12.01yrs (1.39) Non-ADHD 12.05 yrs (1.30)	Wave 1: ADHD 30.41 (10.19) Non-ADHD 10.42 (8.91) Wave 2: ADHD 25.72 (11.70) Non-ADHD 8.78 (9.38) Wave 3: ADHD 23.94 (11.44) Non-ADHD 10.39 (10.11) diagnosis	parenting was only investigated as mediator
[37] (USA)	37 two-parent families	Mother: 41.03 (5.83) Father: 42.94 (7.19)	m = 100% continuously	37 29.7 %	8.29 yrs (2.00)	100% ADHD 48.6% ODD 8.1% CD 2.95% conduct problems diagnosis	paternal involvement was only investigated as moderator, no focus on specific parenting strategies
[38](Germany)	96 two-parent families	Mother: 43.0 (5.5) Father: 45.5 (5.8)	no percentage above clinical cut-off reported continuously	96 affected f = 14% 96 unaffected f = 55.2%	affected: 11.4 yrs (3.9) unaffected 11.0 yrs (4.6)	50% diagnosis	comorbidity of autism spectrum disorder in ADHD affected children
[39] (USA)	90 two-parent families	Mother: 40 (?) Father: 42 (?)	5% > clinical cut-off continuously	90 15.56 %	10.77 yrs (?)	56.67% ADHD diagnosis	same sample as in Wymbs *et al.* (2015) except that additionally to parental ADHD symptoms parental depression was considered

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