

Practitioner Review: Current best practice in the use of parent training and other behavioural interventions in the treatment of children and adolescents with attention deficit hyperactivity disorder

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Background: Behavioural interventions are recommended for use with children and young people with attention deficit hyperactivity disorder (ADHD); however, specific guidance for their implementation based on the best available evidence is currently lacking. **Methods:** This review used an explicit question and answer format to address issues of clinical concern, based on expert interpretation of the evidence with precedence given to meta-analyses of randomised controlled trials. **Results:** On the basis of current evidence that takes into account whether outcomes are blinded, behavioural intervention cannot be supported as a front-line treatment for core ADHD symptoms. There is, however, evidence from measures that are probably blinded that these interventions benefit parenting practices and improve conduct problems which commonly co-occur with ADHD, and are often the main reason for referral. Initial positive results have also been found in relation to parental knowledge, children's emotional, social and academic functioning – although most studies have not used blinded outcomes. Generic and specialised ADHD parent training approaches – delivered either individually or in groups – have reported beneficial effects. High-quality training, supervision of therapists and practice with the child, may improve outcomes but further evidence is required. Evidence for who benefits the most from behavioural interventions is scant. There is no evidence to limit behavioural treatments to parents with parenting difficulties or children with conduct problems. There are positive effects of additive school-based intervention for the inattentive subtype. Targeting parental depression may enhance the effects of behavioural interventions. **Conclusions:** Parent training is an important part of the multimodal treatment of children with ADHD, which improves parenting, reduces levels of oppositional and noncompliant behaviours and may improve other aspects of functioning. However, blinded evidence does not support it as a specific treatment for core ADHD symptoms. More research is required to understand how to optimise treatment effectiveness

Conflict of interest statement: See acknowledgements for disclosures.

either in general or for individual patients and explore potential barriers to treatment uptake and engagement. In terms of selecting which intervention formats to use, it seems important to acknowledge and respond to parental treatment preferences. **Keywords:** ADHD; behaviour therapy; conduct disorder; parent training; treatment trials.

Introduction

Behavioural interventions are defined in this review as those interventions which are directed at improving an individual's conduct (increasing desired behaviours and decreasing undesired behaviours), using strategies based on reinforcement and social learning principles and other cognitive theories. This includes classical contingency management, behaviour therapy (mainly through mediators such as parents or teachers) and cognitive behaviour therapy (such as verbal self-instruction, problem-solving strategies or social skills training). These treatments are usually offered in several sessions over time and implemented either through training the mediator(s), the child or both, with training guided by an explicit protocol (Sonuga-Barke et al., 2013). Interventions employing behavioural techniques are recommended, and commonly used, in the treatment of children and adolescents with attention deficit hyperactivity disorder (ADHD; Kendall, Taylor, Perez, & Taylor, 2008). However, detailed evidence-based guidance on what, why, when and with whom these should be employed is not well described.

In the past, systematic reviews and meta-analyses have been cited as evidence of the value of these approaches for ADHD (Charach et al., 2013; Corcoran & Dattalo, 2006; Fabiano et al., 2009). However, it is our opinion that these reviews have often been overinclusive, combining both randomised and non-randomised studies and that they have also lacked transparency, making it difficult to understand which studies and outcomes contribute to the stated effect size estimates. This makes their relevance to clinical practice difficult to interpret. These reviews also failed to address the issue of overreliance on unblinded outcomes that is known to be a major source of bias in treatment trials (Wood et al., 2008).

The European ADHD Guidelines Group (EAGG) have recently conducted several meta-analyses of randomised controlled trials (RCTs) of behavioural interventions using stringent inclusion and exclusion criteria which have addressed these shortcomings (Daley et al., 2014; Sonuga-Barke et al., 2013). These meta-analyses used recognised scales to evaluate the quality of the studies. Most importantly, the EAGG attempted to address the impact of blinding on estimates of treatment efficacy. To do this, the outcomes 'most proximal' to treatment delivery, which in behavioural interventions are nearly always unblinded (e.g. ratings of symptoms by parents who received the intervention), were compared with outcomes judged to be 'probably blinded' (e.g. direct observation by independent researchers or ratings by informants not aware of treatment allocation). Not all studies had blinded measures, but where they did, the difference

between most proximal and probably blinded ADHD assessments was clear. There was a statistically significant positive effect of behavioural interventions on the most proximal, parent ratings ($d = 0.40$; CI: 0.20–0.60), and a nonsignificant effect when probably blinded measures were used ($d = 0.02$; CI: –0.30 to 0.34). The EAGG concluded that, on the basis of current evidence, that takes in to account whether outcomes are blinded, behavioural intervention could not be supported for the treatment of core ADHD symptoms. The situation was different for other important outcomes (Daley et al., 2014). Behavioural interventions had significant effects on probably blinded measures of parenting (positive parenting $d = 0.63$; CI: 0.47–0.78 negative parenting $d = 0.43$ CI: 0.24–0.62) and childhood conduct problems ($d = 0.31$; CI: 0.05–0.57).

In this practitioner review, we provide, for the first time since the publication of these analyses, detailed interpretation of the findings and guidance for commissioners and clinicians on the use of behavioural interventions for the treatment of children and adolescents with ADHD. Our review has a broad scope covering issues of treatment benefits, therapeutic content and delivery as well as indications and contraindications. There is also some consideration of the relationship between behavioural treatments and other nonpharmacological approaches. The issue of the relationship with medication, although important, is outside the scope of the current review and will be the focus of future publications. We have attempted to cover all interventions based on behavioural principles for children and adolescents. However, as nearly all trials that met the inclusion criteria for the EAGG meta-analyses (31 out of 32 studies) focused on parent-based approaches (i.e. parent training), most of our guidance relates to parent training or interventions with a parent training component in preschool and school-aged children. In line with our previous practitioner review (Cortese et al., 2013), we have employed a question and answer format. Questions were generated after consultation with clinicians and service users. Answers were based on expert interpretation of existing best available evidence. As much of the evidence is drawn from studies with a major parent training component, we will use the terms behavioural intervention and parent training interchangeably unless there is evidence that the effects would be different for parent training and other behavioural interventions.

Methods

Generation of questions and answers

There was consultation at various levels during the development of this Practitioner Review. The clinical questions were first created by the EAGG Behavioural Interventions Bln

group (an interdisciplinary group of academic clinicians, of whom the majority are behaviour therapists), circulated to the wider EAGG group as well as ADHD advocacy groups and ADHD clinician groups in the United Kingdom, the Netherlands and Belgium for feedback. Questions were amended in line with feedback; and further questions of clinical relevance suggested by these groups were added. After preparation of the first draft of the manuscript by the EAGG BIn Group, the manuscript received a first round of feedback from the wider EAGG group. After adaptation by the BIn group, there was additional final feedback from the wider EAGG group who are all clinicians and academics working in the ADHD area.

First bottom-up questions were drafted by the Bin group without ordering them into the four subthemes [(a) treatment benefits, (b) therapeutic content and delivery, (c) treatment indications and (d) contraindications and relationship to other nonpharmacological treatments]. After reviewing the questions, these four logical main themes of questions emerged, and questions were re-ordered into these subthemes. Feedback on order and placing of these questions under subthemes was provided by the broader EAGG group and ADHD advocacy groups and clinicians in the United Kingdom, the Netherlands and Belgium.

Providing answers. In each case, answers are based on expert interpretation of the best available evidence. In terms of evidence, precedence was given to systematic reviews and/or meta-analyses of RCTs. Where no RCT data were available to answer a specific question, other evidence, including that from more pragmatic trials and observational studies, was taken into account on a case-by-case basis. Strength of evidence ratings are provided for all recommendations using the Scottish Intercollegiate Guidelines Network SIGN development guide which rates levels of evidence from the highest 1++ which is evidence based on high-quality meta-analysis to the lowest four where evidence is based solely on expert clinical opinion (see text box). In the case where meta-analyses were available, the SIGN ratings took into account the quality of the trials in the meta-analysis – downgrading those where the trials had a high risk of bias or where there was a high level of heterogeneity between studies – even if the meta-analysis itself was high quality. Effect sizes were interpreted according to criteria outlined by Cohen (1992) with an effect size of 0.2 representing a small effect, 0.5 a medium effect and 0.8 a large effect.

SIGN Guidelines levels of evidence (www.sign.ac.uk).

- 1++ High-quality meta-analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
- 1+ Well-conducted meta-analyses, systematic reviews or RCTs with a low risk of bias
- 1– Meta-analyses, systematic reviews or RCTs with a high risk of bias
- 2++ High-quality systematic reviews of case-control or cohort studies. High-quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
- 2+ Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
- 2– Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
- 3 Nonanalytic studies, for example, case reports, case series
- 4 Expert opinion

Results

Each section of this Practitioner Review is divided into three parts. For each question, the same format is followed. First a rationale for the question is provided. Then, the relevant evidence that addresses that question is reviewed. Finally, a short concluding statement providing clinical guidance is made.

Treatment benefits

In this section, we explore the beneficial effects of behavioural interventions for children and adolescents with ADHD in relation to parent and child outcomes.

Q1.1: Do behavioural interventions enhance parental knowledge about ADHD?. Rationale: Many behavioural interventions have a psychoeducational component giving information about the nature of the disorder (Montoya, Colom, & Ferrin, 2011). The primary aim of this is to increase parents' knowledge about the nature of ADHD, its possible causes and general course and the treatment options of the disorder. This may be a goal in itself but also a necessary basis for subsequent therapeutic intervention.

Evidence: There is no meta-analysis of the effects of behavioural interventions on parental knowledge of ADHD. One review of the effects of psychoeducation supported its value but also highlighted the poor evidence base and the methodological limitations of studies (Montoya et al., 2011). A higher level of knowledge of ADHD has been shown to be related to more favourable parental opinions of behavioural interventions. Enhanced knowledge increases the likelihood of engagement in pharmacological and nonpharmacological treatments (Corkum, Rimer, & Schachar, 1999). A recent study has also shown that receipt of psychoeducation may result in lower parental unblinded ratings of ADHD (over two standard deviations) as well as enhanced adherence to ADHD medication ($r = .42$; Bai, Wang, Yang, & Niu, 2015).

Guidance: Behavioural interventions that educate parents about ADHD may be used to help parents understand more about ADHD and encourage engagement in medication treatment.

SIGN rating for the level of evidence that psychoeducation:

- enhances parents' knowledge about ADHD = 4
- enhances engagement with treatment = 1–

Q1.2: Do behavioural interventions improve parenting behaviour and the quality of parent-child relationships?. Rationale: An implicit assumption of the behavioural treatment model is that

improving parents' behaviour towards their children with ADHD improves the behaviour of children with ADHD. This is also likely to improve the quality of the parent-child relationship more generally (i.e. the positive feelings and attitudes the parent and child have towards one another). Therefore, more appropriately targeted parenting should be a prerequisite for therapeutic effectiveness (Hinshaw et al., 2000).

Evidence: Meta-analyses suggest that both blinded measures of parenting behaviour (positive parenting $d = 0.63$; CI: 0.47–0.7; negative parenting $d = 0.43$; CI: 0.24–0.62) and parent self-reports of parenting self-concept ($d = 0.37$; CI = 0.03–0.70) are improved by behavioural interventions (Daley et al., 2014). During face-to-face interactions levels of positive parenting (e.g. warmth, reward) are increased and levels of negative parenting (e.g. harshness, criticism) are reduced. The quality of more general parent-child relationship as represented by parent and child feelings and attitudes to one another has only rarely been used as an outcome in behavioural intervention trials. As a result, we know little about whether the child and/or parent attitudes and feelings towards each other improve following intervention. However, there is blinded evidence for reduced child oppositional behaviour (Daley et al., 2014; $d = 0.31$; CI: 0.05–0.57), which may lead to increased engagement and cooperation from the child towards their parents and, potentially, improved parent-child relationships. Behavioural interventions that have directly tested the impact of intervention on parent's feelings about their relationship with their child (usually termed expressed emotion) do show a reduction in expressed emotion (enhancement of warmth and reduction in criticism) in children with behavioural problems (Scott et al., 2010). Only one small-scale ADHD-specific study to date has explored the impact of behavioural intervention on expressed emotion (Thompson et al. 2009). Results showed that while overall expressed emotion was not significantly reduced in the intervention arm compared with treatment as usual, there were significant reductions in parents' negative comments ($d = 0.73$).

Guidance: Behavioural interventions can be used to improve parenting behaviour and increase parents' sense of self-worth. They may also lead to improvement in parent-child relationships, but there is limited evidence to support this latter aspect.

SIGN rating for level of evidence showing behavioural interventions improve:

- parenting (and parental self-concept) = 1+
- the quality of parent-child relationship more generally = 1-

Q1.3: Can behavioural interventions reduce ADHD symptoms?. Rationale: Parent training interventions for ADHD often focus on reducing coexisting problems and impairments rather than ADHD symptoms (Tarver, Daley, & Sayal, 2015). These coexisting problems and impairments are often the main reason for referral (O'Conner et al., 2015) and the treatment goal for many interventions. Nevertheless, behavioural interventions have also been recommended as a way to reduce core ADHD symptoms (O'Conner et al., 2015).

Evidence: Meta-analyses have demonstrated positive effects with moderate (0.67 Fabiano et al., 2009) to large ($d = 0.87$; Van Der Oord, Prins, Oosterlaan, & Emmelkamp, 2008) effect sizes for the impact of behavioural interventions on parental reports of ADHD. Given that parents providing the ratings also received the intervention and were therefore aware of treatment allocation, these ratings could be considered to produce a high risk of bias. In our meta-analyses (Daley et al., 2014; Sonuga-Barke et al., 2013), these effects reduced to approximately zero with broad confidence intervals when probably blinded ratings were considered ($d = 0.02$; CI –0.30 to 0.34). When the probably blind meta-analysis was limited to studies of no/little medication in the comparison arm, the effect remained nonsignificant ($d = 0.26$; 95% CI: –0.08, 0.60), but the point estimate and confidence intervals do not exclude a small beneficial effect. The probably blinded measures are a mixture of teacher reports and direct observations which in some cases may not be optimal for identifying changes in ADHD behaviours in the home. This pattern does not appear to differ as a function of whether the assessed outcome is inattention or hyperactivity/impulsivity or which ADHD presentation the participants have (Hoath & Sanders, 2002; Piffner et al., 2007; Webster-Stratton, Reid, & Beauchaine, 2011).

Guidance: Based on evidence that parent training does not reduce ADHD symptoms when measured by individuals blinded to treatment allocation, it is not presently supported as a way of reducing core ADHD symptoms. However, the effects on parent's reports suggest that these interventions change parental perceptions of their child's behaviour and these could be important even if they do not change actual levels of ADHD. However, there is currently no evidence to support this view.

SIGN rating for the level of evidence that parent training:

- reduces nonblinded measures of ADHD symptoms = 1+
- does not have effects on blinded ADHD outcomes likely to be of sufficient size to have clinical value = 1-

Do behavioural interventions reduce coexisting behavioural and emotional problems in children with ADHD?. Rationale: Many behavioural packages were initially developed to treat children with conduct problems (CP) rather than ADHD. Behavioural interventions used with individuals with ADHD continue to focus on reducing these behavioural problems which are very common in these children (Tarver et al., 2015).

Evidence: Meta-analyses confirm that behavioural interventions reduce conduct problems in children with ADHD (Fabiano et al., 2009; Van Der Oord et al., 2008). In the EAGG reviews, this extended to probably blinded measures, where small to moderate effects ($d = 0.31$; CI: 0.05–0.57) have been reported (Daley et al., 2014). Few studies have examined the impact of behavioural interventions on emotional problems. One meta-analysis suggests a moderate positive effect on unblinded measures of internalising behaviours in preschool children with ADHD (SMD -0.48 ; 95% CI: -0.84 to -0.13 ; Zwi, Jones, Thorgaard, York, & Dennis, 2011), but this was based on just two studies.

Guidance: Behavioural interventions can be used to reduce conduct problems, but there is less evidence that behavioural interventions lead to improved emotional functioning in children with ADHD.

SIGN rating for level of evidence that behavioural interventions:

- Improve behavioural problem symptoms = 1+
- Reduce emotional problems = 1–

Do behavioural interventions have benefits in terms of social and academic functioning. Rationale: Children with ADHD often have impairments in social and academic functioning. Targeting ADHD and comorbid symptoms has the potential to enhance social and academic functioning, especially if the behavioural approaches include specific modules that target these deficits.

Evidence: Consistent with other meta-analyses (Van Der Oord et al., 2008), our meta-analysis demonstrated moderate but significant effects ($d = 0.47$; CI: 0.15–0.78) on unblinded parental and teacher ratings of social skills (Daley et al., 2014). Trials that report a positive effect typically include a specific social skills component (Piffner & Mcburnett, 1997). With regard to academic functioning, Daley et al. (2014) found small but significant effects ($d = 0.28$; CI: 0.06–0.59) from six parent or teacher reports (performance ratings and homework problem checklists) and three objective measures (actual school grade performance) of academic functioning. Another meta-analysis reports similar results (Van der Oord, Prins, Oosterlaan & Emmelkamp 2008, $d = 0.19$). Again, studies showing the

most benefit often incorporated an academic or organisational skills component often delivered at school (Daley et al., 2014; Evans et al., 2016).

Guidance: When adapted to include specialist modules targeting social or academic skills, behavioural interventions may have beneficial effects on social skills and academic functioning.

SIGN rating for level of evidence that behavioural interventions improve social or academic functioning = 1

Summary of benefits of behavioural interventions. Based on current evidence, the positive effects on ADHD symptoms reported by parents are not corroborated by independent blinded sources and may reflect a change in parents' attitudes and perceptions about their child with ADHD rather than any actual change in behaviour (Daley et al., 2014). This is in contrast to the impact of behavioural interventions on conduct problems where the evidence from independent sources corroborates the view of parental reports. Behavioural interventions may improve academic and social functioning, but the lack of independent blinded measures for either outcome in our meta-analysis (Daley et al. (2014) makes the unblinded improvements difficult to interpret at the meta-analytic level. There is also evidence that behavioural interventions enhance parental behaviours towards their children. They increase positive and reduce negative parenting even on blinded measures, which may eventually have a positive effect on future outcomes.

Therapeutic content and delivery

In this section, we discuss the evidence relating to which types of behavioural intervention are most effective and how they should be delivered.

Q2.1: What are the important elements in effective behavioural interventions?. Rationale: Behavioural interventions are generally based on reinforcement and social learning theory. Group-based interventions, grounded in the principles of social learning theory and behaviour modification, are recommended as interventions for ADHD (Kendall et al., 2008) but include a range of different components that may or may not be of value.

Evidence: There are no systematic reviews or meta-analyses assessing the relative value and impact of the different components of behavioural interventions for ADHD. One meta-analysis of programmes for children 7 years and younger with more general behaviour problems (Kaminski, Valle, Filene, & Boyle, 2008) showed that components that aimed to increase emotional communication skills ($d = 1.47$ compared with $d = 0.35$ for interventions without

this aim), taught parents to use time-out ($d = 0.52$ compared with $d = 0.36$ for interventions without this aim), and targeted parenting consistency ($d = 0.59$ compared with $d = 0.36$ for interventions without this aim) were consistently associated with larger effects sizes. However, it is not clear whether these findings would also be true for children with ADHD.

Guidance: Because it is unclear yet what the active components of behavioural interventions are, therapists should implement interventions in the way they were intended to be used and not use component parts of interventions in isolation.

SIGN rating for the level of evidence that therapists: should not use components of interventions in isolation = 4.

Q2.2: Are there benefits of behavioural interventions adapted specifically for ADHD compared with more generic behavioural approaches? Rationale:

At least one behavioural programme has been designed to target underlying features of ADHD – such as self-regulatory and cognitive problems (Sonuga-Barke, Thompson, Abikoff, Klein, & Brotman, 2006) on the grounds that this will lead to better effects on core symptoms.

Evidence: One RCT (Abikoff et al., 2015) has compared a generic parent training approach (Helping the Noncompliant Child; McMahon & Forehand, 2003) and an ADHD-specific programme (New Forest Parenting Programme, NFPP; Sonuga-Barke et al., 2006). The specific ADHD approach did not show greater efficacy on child behaviour (ADHD, conduct problems) or parental stress or parenting practices. A second large trial (Sonuga-Barke et al., in press) also failed to demonstrate superiority of NFPP over a different generic approach (Incredible Years infant programme, Webster-Stratton, 2015).

Guidance: ADHD-specific programmes are not superior to generic programmes and therefore both approaches should be considered.

SIGN rating for level of evidence that programmes designed specifically for ADHD are no more effective than generic programmes is 1–

Q2.3: Is the treatment setting important (i.e. home vs. clinic; individual vs. group)? Rationale: Home-based parent training programmes may be more effective than clinic based ones, as the behavioural techniques can be more easily contextualised and individualised. Alternatively, group-based programmes may facilitate the sharing of experiences between parents.

Evidence: There is little available evidence to support one treatment setting (home vs. clinic) or delivery

structure (individual vs. group) over another. General engagement and drop-out rates for group-based programmes for children with conduct problems are high and usually between 25% and 40% (Koerting et al., 2013; Scott & Dadds, 2009). A general review of parent training programmes concluded that programmes should include home visits to provide tailored support (Moran & Ghatge, 2005). A recent study comparing home-based individual parent training versus a group-based parent training programme delivered in non-home-based settings showed no difference between the two interventions in terms of ADHD or conduct problem outcomes, but the home-based individual programme was associated with lower levels of participants drop-out and cost less than the group programme (Sonuga-Barke et al., submitted). In this study, cost differences were due to expensive facility costs (crèches, halls and refreshments and travel costs) and higher preparation/supervision and training costs for the group-based approach (Incredible Years).

Guidance: The effects of behavioural interventions do not vary across treatment setting and delivery structure. In considering where and how to deliver behavioural interventions it seems likely that patient preferences and cost of delivery will be the most important factors to consider.

SIGN rating of level of evidence that one setting or mode of delivery is not better than another is 1–.

Q2.4: Who should deliver the interventions? What level of training/supervision is necessary? Rationale:

Given the complex nature of many behavioural interventions levels of training and supervision are likely to impact on their success.

Evidence: There is no meta-analytic evidence to answer this question and no studies that have systematically varied the amount of training and supervision. Nearly all RCTs are implemented with highly trained, motivated and skilled therapists under careful supervision. Therefore, the most relevant evidence comes from studies which have looked at the effects of behavioural interventions delivered as standard care. One RCT found that effects were reduced to nonsignificance when interventions were implemented by randomly selected therapists delivering treatment as part of their everyday caseload compared with specialist therapists working on a clinical trial study (Sonuga-Barke, Thompson, Daley, & Laver-Bradbury, 2004). In contrast, another study (Hautmann, Hanisch, Mayer, Plurck, & Dopfner, 2008) found positive effects on unblinded ADHD symptoms and behaviour problems when behavioural interventions were included in routine care; effects were equal in size to the original efficacy study. A third study (Van Den Hoofdakker et al., 2007) found positive effects of behavioural parent

training delivered as an adjunct to routine care (including pharmacotherapy) by experienced psychologists on unblinded measures of behaviour problems and ADHD symptoms. Authors of these trials highlight the importance of therapist motivation and the need to deliver the intervention with fidelity (as intended) – factors shown to predict outcome of treatment for children at risk of conduct problems (Eames et al., 2010).

Guidance: Effective use of behavioural intervention is likely to require investment in training and supervision to ensure interventions are delivered with fidelity.

SIGN rating of level of evidence that intervention needs to be delivered by well-trained and motivated therapists = 4.

Should both mothers and fathers and their children be actively involved in behavioural interventions?. Rationale: The involvement of both parents is predicted to increase consistency of the implementation of strategies and shared understanding of ADHD and lead to better outcomes. Involving children increases the ecological validity of the training setting.

Evidence: In general, fathers have not been included in RCTs of behavioural interventions (Fabiano, 2007). In relation to ADHD, only one programme, combining parent training with sports activities, has been specifically designed for fathers and demonstrated small to moderate effects on unblinded observations of frequency of Total Praise ($d = 0.54$), and Total Negative comments ($d = 0.57$) for fathers (Fabiano et al., 2012). However, to our knowledge, there is no study directly comparing the effects of an intervention delivered to a single parent compared with both parents. With regard to child involvement, a review of generic behavioural programmes not specifically targeting ADHD (Kaminski et al., 2008) indicates that programmes which encourage parents to practice with their own child during sessions reported larger effect sizes ($d = 0.91$) than programmes without this treatment component ($d = 0.33$) although the authors did not directly compare the two sets of effect sizes. This may highlight the potential importance of including practice with the child in the therapeutic process,

Guidance: Despite the lack of direct evidence therapists should still try to include fathers and children in training where practical, but will need to take account of complexity of family composition and overcome barriers to achieve this.

SIGN rating of level of evidence that parents and children should be involved:

- fathers should be involved in intervention = 4
- children should be involved in intervention = 4

Summary of evidence relating to therapeutic content and delivery. High-quality evidence is lacking to help answer most of the questions relating to therapeutic context and delivery. There has been little attempt to identify the key elements necessary for effectiveness. Furthermore, based on limited evidence, behavioural interventions seem to be robust to setting and delivery type and specialised interventions do not show advantages over more generic approaches. However, in this regard, individual patients and families may prefer a particular form of intervention, and this is likely to have an impact on both engagement and outcome. The quality of therapist training and supervision are likely to be important, but greater research is required to explore this. Involving fathers and children directly in their own treatment is likely to enhance their value. Choices between different behavioural interventions may ultimately depend on practical considerations and cost.

What are the treatment indications and contraindications?

In this section, we will focus on individual differences that determine who should and should not use behavioural interventions.

Q3.1: Should behavioural interventions be used only where parents have clear parenting deficits/difficulties?. Rationale: The aim of behavioural parent training is to provide parents with enhanced strategies that they can apply to help raise children with challenging behaviour; it, therefore, seems logical that it should target parents who lack these additional skills.

Evidence: In the past, inclusion in RCTs has been based on children having ADHD and not on a lack of parenting abilities. Improvements in parenting, especially reductions in negative parenting and improvements in positive parenting, have been shown to mediate the relationship between receipt of intervention and change in behaviour problems for children at risk of conduct problems (Gardner, Hutchings, Bywater, & Whitaker, 2010). However, there is no evidence to suggest that intervention-related improvements in parenting occur only for those families with low pre-existing parenting skills or deficits.

Guidance: Behavioural interventions should continue to be offered to parents irrespective of the absence of dysfunctional parenting.

SIGN rating of level of evidence that parent training should be available to all parents, independent of pre-existing parenting skills = 4

Q3.2: Is it important to take account of patient and parent preferences?. Rationale: It seems reasonable to assume that patients and parents will be less

likely to engage with, or work at, interventions that they either do not want, do not believe work or do not value, and which are not delivered in the way that they would prefer.

Evidence: A recent large study showed that around two thirds of parents of children with ADHD had a preference for individual over group parent training or other alternatives (Wymbs et al., 2016). The majority of parents were seeking to feel more informed about their child's problems and to understand as opposed to solve their child's difficulties. About one fifth of parents preferred group-delivered therapy and the same amount preferred a minimal information alternative (i.e. just information). Parents with a preference for minimal information reported the highest levels of depression and had children with the most complex problems. These findings suggest that not all help-seeking parents are looking or willing to engage in behavioural parent training interventions known to be effective. This suggests that services need to consider ways to help motivate parents to engage in behavioural parent training or provide alternative methods of intervention such as child-focused interventions. He, Gewirtz, Lee, Morrell, & August (2016) found that families accessing mental health clinics (not specifically for ADHD) displayed a clear preference for individual therapy, and those that were able to choose this option were more likely to remain in treatment. This evidence of a preference for individually delivered therapy is at odds with current guideline recommendations in the United Kingdom (Kendall et al., 2008), which recommends group over individual intervention for ADHD.

Guidance: Parent and patient preferences should be taken into account when planning behavioural interventions, although little is known about the relationship between preferences and treatment outcomes. A range of individual and group-based approaches should be available.

Sign rating of level of evidence that patient and parent preferences about mode of intervention should be taken into account = 4

Q3.3: What are the barriers to initial engagement in behavioural interventions? How might these be overcome?. Rationale: Parents need to engage with behavioural parent training for it to be effective – but many families are in complex circumstances and nonengagement is often a challenge for services.

Evidence: A qualitative review explored barriers to engagement in parent training programmes from both parental and clinician perspectives (Koerting et al., 2013). Barriers identified by parents and clinicians included situational factors (e.g. transport and child-care problems, inconvenient timings),

psychological factors (fear, stigma and distrust), lack of awareness or unavailability of programmes and issues with poor interagency collaboration. A second study (Smith et al., 2015) explored how to overcome barriers to early behavioural intervention for ADHD from both parent and clinician perspectives. Their results indicated that enhancing parental motivation to change parenting practices and providing an intervention that addressed the parents' own needs was important (e.g. in relation to self-confidence, depression or parental ADHD), in addition to those of the child. Comparisons between the views of parents and practitioners highlighted a need to enhance awareness of parental psychological barriers among practitioners and for better programme advertising generally. However, there are no empirical studies of the effects of removing barriers to engagement on treatment outcome.

Guidance: Clinicians should be sensitive to the concerns of parents and actively try to address barriers to treatment engagement whenever possible.

SIGN rating of level of evidence that barriers to engagement need to be addressed = 2++

Q3.4: Are there parental difficulties that reduce/improve treatment effectiveness?. Rationale: Behavioural parent training interventions use parents as agents of change to help their child. It seems plausible that certain parental characteristics (mental health problems, literacy intellectual abilities or motivation) could disrupt that process.

Evidence: The multimodal treatment of ADHD Study (MTA) group conducted several moderator analyses for their main outcomes (Jensen, 1999). In these, parental characteristics did not predict treatment outcome (Owens et al., 2003). In contrast, Sonuga-Barke, Daley, and Thompson (2002) and Chronis-Tuscano et al. (2011) showed that the effects of parent training were reduced by high levels of ADHD in mothers. Also, Dawson, Wymbs, Marshall, Mautone, and Power (2014) showed that parents at risk for ADHD had particular difficulty maintaining treatment effects in the longer term. In contrast, one study showed no effect of either parental ADHD or depression but did report a moderating role for parental self-efficacy on unblinded ADHD and conduct problems (Van Den Hoofdakker et al., 2010). The impact of other parental characteristics such as intellectual ability, motivation and literacy on the outcomes of behavioural interventions has not yet been studied systematically.

Guidance: There is little systematic evidence to suggest that behavioural interventions will be less effective with parents with mild to moderate mental health problems, but therapists can consider adjusting delivery to take account of ADHD in parents.

SIGN rating of level of evidence that parental ADHD: reduces the effectiveness of parenting training is 2++

Q3.5: Are there family situations where behavioural interventions are contraindicated?. Rationale: Behavioural interventions could exacerbate existing marital conflict or enhance the burden on already stressed parents.

Evidence: There is no evidence that contraindicates behavioural interventions for particular families. However, when making referrals to behavioural programmes, clinicians should reflect on the fact that family dynamics may be altered by participation in behavioural interventions. Chronis, Chacko, Fabiano, Wymbs, and Pelham (2004) reviewed evidence that parents participating in behavioural interventions who displayed clinically significant levels of marital dissatisfaction at pretreatment tended to direct aversive behaviours towards their spouses (e.g. negative feedback, argumentativeness, noncompliance, ignoring) when their child was misbehaving.

Guidance: There is no evidence to suggest that behavioural interventions are contraindicated if specific family problems are present. However, therapists should be sensitive to the potential impact of behavioural interventions on family dynamics.

SIGN rating of level of evidence that in families with poor functioning parent training should not be used due to risk of negative effects of family functioning = 4

Q3.6: Does disorder severity and comorbidity reduce the effectiveness of behavioural intervention?. Rationale: More symptomatic and complex ADHD cases may have more deep-rooted and complex causes which could make behavioural approaches less effective.

Evidence: It is surprising how little is known about the effects of ADHD severity or comorbidity on treatment efficacy as no studies have sought to randomise participants on these factors. The MTA study found no evidence of the effect of symptom severity on psycho-social treatment outcome (Owens et al., 2003). In contrast, Hautmann et al. (2008) found that the most severely impaired children profit the most from behavioural interventions in terms of externalising behaviour improvement, although these findings were for a general externalising behaviour disordered group. With regard to comorbidity, a meta-analysis found that the presence of conduct disorder reduced the impact of behavioural interventions on unblinded ADHD measures (Lee, Niew, Yang, Chen, & Lin, 2012). In the MTA study, comorbidity of ADHD with anxiety was associated with better outcomes for behavioural

interventions on unblinded ADHD measures (Owens et al., 2003). Number of comorbidities (anxiety/depression or oppositional defiant/conduct disorder) was negatively related to behavioural intervention efficacy in another study with children with no comorbidity or just one comorbidity displaying a superior response to behavioural intervention, compared with those with two or more (Van Den Hoofdakker et al., 2010). A recent study, comparing a specialised ADHD intervention and a generic intervention developed specifically to treat noncompliance, found that the latter was generally more effective at treating conduct problems where individuals had comorbid ADHD and conduct problems (Forehand et al., 2016).

Guidance: Behavioural interventions can be used for children with ADHD irrespective of the severity of their symptoms. Comorbidity may alter the effects of behavioural interventions, but these are not contraindicated for children with comorbidity.

SIGN rating of level of evidence regarding symptom severity and comorbidity that:

- symptom severity does not impact on treatment efficacy = 2++
- comorbidity does impact on treatment efficacy 1–

Q3.7: Is early intervention more effective? Does it reduce long-term risks of ADHD?. Rationale: Larger effects of behavioural interventions may be expected in preschool children when neuroplasticity is greatest, before either the full-blown disorder is established or the development of comorbid disorders has occurred and while parent-child relationships are still relatively intact.

Evidence: RCTs have focused mainly on preschool and primary school-aged children. Most meta-analyses do not report a significant impact of age on outcomes of behavioural interventions (Hodgson, Hutchinson, & Denson, 2012; Lee et al., 2012; Mulqueen, Bartley, & Bloch, 2013). However, our recent meta-analysis (Daley et al., 2014) found larger effects in younger children on unblinded ADHD measures ($t = -2.63$, $p = .03$), conduct problems ($t = -2.46$, $p = .05$) and positive parenting ($t = -2.63$, $p = .03$). With regard to long-term effects, significant treatment effects are maintained but their magnitude declines (Lee et al., 2012). However, evidence for these long-term benefits may be contaminated by participants' exposure to other treatments during the follow-up period (Jones, Daley, Hutchings, Bywater, & Eames, 2008). Given this, there is currently no evidence demonstrating that early intervention with behavioural approaches reduces the long-term risk of ADHD diagnosis or associated comorbid disorders.

Guidance: Clinicians are encouraged to commence behavioural interventions as early as possible before the child's ADHD becomes associated with more

severity, comorbidity, antisocial tendencies and school failure. Behavioural interventions should also continue to be offered to older school-aged children as well.

SIGN rating for level of evidence that early intervention:

- has a special value = 1+
- reduces the long-term risk = 4

Summary in relation to indications and contraindications. There are currently no clear contraindications for the use of behavioural interventions for children and adolescents with ADHD. Research into predictors of treatment outcomes is sparse and inconsistent. More generally, clinicians are advised to listen to parents' thoughts and opinions and to reflect on whether parents are ready to engage with behavioural interventions before commencing treatment. Comorbidity may alter the effects of behavioural interventions, but these are not contraindicated for children with comorbidity. Early intervention, where possible, is encouraged.

Relationship to other nonpharmacological treatments

Q4.1: Is there value in combining parent-focused interventions with school-focused or patient-focused behavioural interventions?. Rationale: Behavioural interventions often show limited generalisability in randomised controlled trials perhaps because they are often delivered by parents at home or in the clinic (Daley et al., 2014). Adding school-based and child-focused interventions may help to enhance generalisation to school settings.

Evidence: A recent meta-analysis (Chan, Fogler, & Hammerness, 2016) of treatments for adolescents with ADHD has demonstrated that behavioural interventions (which were mostly adolescent focused but were sometimes augmented with teacher and/or parent components) were associated with robust (Cohen *d* range, 0.51–5.15) improvements in mostly parent-rated academic and organisational skills, such as homework completion and planner use. Although studies have shown the effectiveness of integrated school/home programmes compared with control groups (Ostberg & Rydell, 2012; Pfiffner et al., 2007; Power et al., 2012), only one study has systematically assessed the additive value of school intervention (and a child skills training) to parent training in a sample of children with the inattentive subtype of ADHD (Pfiffner et al. 2014). Results showed superior effects of integrated home-school treatment as compared with parent training alone on unblinded teacher-reported inattention, organisational skills, social skills, and global functioning at posttreatment. However, at follow-up during the subsequent

school year, differences in teacher-reported outcomes were not statistically significant.

Although several treatment studies have combined child-focused and parent-focused elements (e.g. Abikoff et al., 2013; Pfiffner et al., 2007; Webster-Stratton et al., 2011) and reported positive results, few studies have systematically assessed the additional value of a child-focused element to parent training. Some early studies combined parent training with child-focused treatment (targeting child self-control) and assessed the separate and combined effects. In these studies, there was no evidence for additive effects of child-focused problem-solving treatment on ADHD and conduct problems (Horn, Ialongo, Greenberg, Packard, & Smithwinberry, 1990; Horn, Ialongo, Popovich, & Peradotto, 1987).

Guidance: Adding school-based intervention may hold promise for the inattentive presentation/subtype of ADHD. There is little current evidence for combining child-focused problem-solving treatment with parent training.

SIGN rating of evidence that adding further:

- school-based elements to parent training is advantageous = 1–
- child-focused elements is advantageous = 1–

Q4.2: Can behavioural interventions be combined with cognitive training and neurofeedback to improve outcomes?. Rationale: Adding interventions that are more directly targeted at underlying deficits in cognitive mechanisms may enhance the benefits of behavioural interventions.

Evidence: Recent meta-analyses have questioned the efficacy of both cognitive training and neurofeedback as treatments for core ADHD symptoms in terms of data from blinded outcomes (Cortese et al., 2015, 2016). Two recent studies assessed the separate and combined effects of cognitive training and parent-focused behavioural training. Steeger, Gondoli, Gibson, and Morrissey (2015) found no benefit of the combination on unblinded measures of ADHD. Maleki, Mashhadi, Soltanifar, Moharreri, and Ghanaei Ghamanabad (2014) found some evidence of benefits of combined cognitive training and parent training on unblinded outcomes (effect sizes not available) compared with parent training or cognitive training alone; however, this study had a number of methodological limitations. To date, no RCTs have assessed the added combined effects of neurofeedback and behavioural interventions in children/adolescents with ADHD.

Guidance: There is currently no reliable evidence to support the efficacy of working memory training or cognitive training for ADHD or the combination of behavioural and cognitive or neurofeedback interventions.

SIGN rating of level of evidence regarding combinations with cognitive interventions that:

- working memory training does not enhance the effects of parent training = 1-
- neurofeedback does not enhance the effects of parent training = 4

Q4.3: Should behavioural interventions be combined with treatment for parents' mental disorders/psychiatric diseases?. Rationale: Given the fact that the parent is usually the agent of change in behavioural interventions, parental psychopathology and psychological states may impact on the effectiveness of behavioural interventions. In these cases, combining treatment for the child with treatment for the parent may enhance both child and parent outcome.

Evidence: In our recent meta-analysis, no effect of behavioural interventions was found on parental mental health (Daley et al., 2014). Some studies have compared additive effects of parental treatment to parenting interventions.

Three different domains of parental psychopathology and functioning have been addressed; depression (Chronis-Tuscano et al., 2013), parental stress and lack of social support (Chacko, Wymbs, Chimiklis, Wymbs, & Pelham, 2012; Rajwan, Chacko, Wymbs, & Wymbs, 2014), and parental ADHD (Jans et al., 2015). With regard to the additive value of CBT in combination with regular BPT for mothers with at least mild depressive symptoms, Chronis-Tuscano et al. (2013) showed the additive value of combining treatment for parental depression and child ADHD on child, parenting and parental outcomes (child impairment, family functioning, parental depression) at 3-month follow-up. Another study showed that enhanced parent training (enhanced to target parental stress and coping but also social skills training for the child) reduced drop-out, significantly raised engagement and social support for parents, as compared with standard behavioural treatment (Chacko et al., 2012), although these benefits were too small to be considered clinically significant (Rajwan et al., 2014). Additional multimodal treatment of maternal ADHD did not enhance the effects of a subsequent behavioural parenting intervention on the child's externalising problems, although it significantly reduced unblinded reports of parental ADHD (Jans et al., 2015).

Guidance: Identifying and addressing mental health problems such as depression in parents of children with ADHD children is important. Although potentially beneficial for the parents, it may not increase the effectiveness of behavioural interventions or outcomes for their children, with the potential exception of treatment of parental depression.

SIGN rating of level of evidence that behavioural interventions with treatment for parental mental health is beneficial = 1-

Summary of findings for nonpharmacological treatment combinations. There is very little evidence that adding other nonpharmacological interventions to behavioural interventions improves outcomes. There are positive effects of additive school-based interventions for the inattentive subtype. Targeting parental depression may enhance the effects of behavioural interventions.

Discussion

We have used a question and answer format to address questions about behavioural intervention most typically parent training for the treatment of ADHD that we feel are of particular significance for practitioners and policy makers. We have based our answers, as far as possible, on empirical and peer-reviewed evidence. For every question, we have provided clinical guidance which we hope will be of practical use. We conclude that behavioural interventions have beneficial effects on conduct problems and parenting where evidence from independent sources corroborates parental report. Effects on ADHD symptoms, academic and social functioning are more difficult to interpret as the lack of evidence from independent sources does not rule out the possibility that reported improvements are merely changes in informant perception rather than actual behaviour. The essential elements of behavioural interventions are, as yet, unknown. What is known is that specialised ADHD behavioural interventions are not more effective than more generic behavioural programmes, but if delivered in an individual format may be more cost-effective. Including children in the intervention process may also enhance outcomes. There are few specific indications or contraindications for behavioural interventions but considering whether parents are physically or psychologically able, and ready to engage and implement behavioural interventions may be clinically important. There is very little reliable evidence that adding other non-pharmacological interventions to behavioural interventions has any benefits.

This review does highlight a number of important gaps in the current evidence base. First, there is a need to enhance the number of studies that use blinded or independent outcomes across multiple measures, but especially for ADHD, academic functioning and social skills, to explore whether proximally reported improvements reflect actual improvement, or merely changes in informant perception. In doing this, it will be important to be able to control for the influence of rater bias and context on differences between Most Proximal and Probably Blinded informants reports. Second, additional work

is required to identify mediators and moderators that can help better understand the mechanisms and active treatment components which are associated with improvement as well as identifying which patients benefit the most. Improving our understanding in this area could allow clinicians to tailor the delivery of intervention to families and children who will benefit the most.

Our guidance is not without its limitations and constraints. Our review of evidence is not based entirely on systematic reviews and meta-analyses. However, we have taken a systematic approach to the synthesis of the evidence where possible, focusing on recent meta-analyses and RCTs. Second, the interpretation of the evidence and the subsequent clinical recommendations are the views of the membership of the EAGG, this applies to all questions but is particularly influential when evidence is weak or inconclusive. In such cases, we have taken a pragmatic approach based on the principles and logic of good clinical practice referenced against the expert clinical opinion of EAGG members to guide our recommendations and have used SIGN evidence ratings to highlight where recommendations are based solely on expert opinion. Third, we have had to give the guidance with almost no reference to the relative financial costs and benefits of the various options. This, of course, is a major handicap for while we might consider that a certain approach is optimal in terms of efficacy it may be prohibitively expensive to implement in routine practice or costs may vary considerably between different healthcare settings. The questions relating to the mode of delivery, the involvement of fathers, the quality of training and supervision and the integration with adjunct therapies are especially likely to be affected by such considerations.

Our hope is that, in the future, stronger empirical evidence will guide clinical recommendations in a more direct way based on clearer evidence to guide day-to-day clinical practice.

Acknowledgements

David Daley: Fees from Eli Lilly, nonfinancial support from Eli Lilly, grants from Shire, personal fees from Shire, nonfinancial support from Shire, fees from Medice and nonfinancial support from Medice, outside the submitted work; and he has also received royalties from the sale of a self-help version of the New Forest Parenting Programme and research funding from NIHR. *Saskia Van der Oord:* Organisational financial interests: a paid consultant for designing a RCT of Plan-It Commander (Janssen Pharmaceuticals) and has received speaker's fees from MEDICE and Shire (all related to talks on nonpharmacological interventions). Research grants: ZonMW (Dutch Mental Health Research Funding Organization)/FWO (Research grant from Flanders Scientific Research Organization)/KU Leuven research grant (University Research Grant). Nonfinancial: Saskia Van der Oord has been involved

in the development, implementation and trailing of 'Braingame Brian', an executive functioning game training for children with ADHD, and Zelf Plannen (Plan my Life) and Zelf Oplossen (solution-focused treatment), two cognitive behavioural planning interventions for adolescents with ADHD. She has no financial interests in either of these interventions. *Sam Cortese:* Reimbursement for travel and accommodation expenses from the Association for Child and Adolescent Central Health (ACAMH), a nonprofit organisation, in relation to lectures that he delivered for ACAMH. *Marina Danckaerts:* Paid member of advisory boards organised by Shire, paid speaker at conferences (not product related) by Shire, Novartis, Medice and paid for consultancy for Neurotech Solutions. Organisational financial interests: department received research grants from Shire and Janssen-Cilag. Nonfinancial interests member of the scientific committee of the Belgian ADHD Guidelines and co-authored on papers on ADHD. *Manfred Döpfner:* Received consulting income and research support from Lilly, Medice, Shire, Janssen Cilag, Novartis, and Vifor and research support from the German Research Foundation, German Ministry of Education and Research, and German Ministry of Health. He received income as Head of the School for Child and Adolescent Behavior Therapy at the University of Cologne and royalties from treatment manuals, books and psychological tests published by Guilford, Hogrefe, Enke, Beltz, and Huber. *Barbara J Van den Hoofdakker:* Research grants from ZonMw (The Netherlands Organisation for Health Research and Development); NWO (The Netherlands Organisation for Scientific Research); UMCG (University Medical Centre Groningen). Receives royalties as one of the editors of 'Sociaal Onhandig' (published by Van Gorcum), a Dutch book for parents of children with PDD-NOS or ADHD that is being used in parent training. Nonfinancial: developed and evaluates several Dutch parent training programmes, without financial interests; is and has been a member of Dutch ADHD guideline groups; is an advisor of the Dutch Knowledge Centre for Child and Adolescent Psychiatry. *David Coghill:* Grants and personal fees from Shire, personal fees from Eli Lilly, grants from Vifor, personal fees from Novartis, personal fees from Oxford University Press, these are outside the submitted work. *Margaret Thompson:* Research grants from NIHR, Solent NHS Trust, European Union (ADDUCE), an MHRN unrestricted research grant from Shire, consultancy fees from Shire, conference sponsorship from Eunethydis, is a co-developer of the New Forest Parenting package (NFPP), and receives dividends from the sale of the NFPP self-help manual. *Philip Asherson:* Received honoraria for consultancy to Shire, Eli-Lilly and Novartis; educational/research awards from Shire, Lilly, Novartis, Vifor Pharma, GW Pharma and QbTech; speaker at sponsored events for Shire, Lilly and Novartis. *Tobias Banaschewski* has served in an advisory or consultancy role for Actelion, Hexal Pharma, Lilly, Medice, Novartis, Oxford outcomes, Otsuka, PCM scientific, Shire and Viforpharma. He received conference support or speaker's fee by Medice, Novartis and Shire. He is/has been involved in clinical trials conducted by Shire and Viforpharma. He received royalties from

Hogrefe, Kohlhammer, CIP Medien, Oxford University Press. *Daniel Brandeis* has worked as an unpaid advisor for an EU-funded neurofeedback trial. *Jan Buitelaar* has been in the past 3 years a consultant to/member of advisory board of and/or speaker for Janssen Cilag BV, Eli Lilly, Lundbeck, Shire, Roche, Medice, Novartis and Servier. He has received research support from Roche and Vifor. *Ralf W. Dittmann* has received compensation for serving as consultant or speaker, or he or the institution he works for have received research support or royalties from the companies or organisations indicated: EU (FP7 Programme), US National Institute of Mental Health (NIMH), German Federal Ministry of Health/Regulatory Agency (BMG/BfArM), German Federal Ministry of Education and Research (BMBF), German Research Foundation (DFG), Volkswagen Foundation, Boehringer Ingelheim, Ferring, Janssen-Cilag, Lilly, Lundbeck, Otsuka, Shire, Sunovion/Takeda and Theravance. Dr. Dittmann owns Eli Lilly stock. *Chris Hollis* has been a Co-investigator on a research grant from Shire Pharmaceuticals to the University of Nottingham to investigate driving behaviour in adults with ADHD (no drug involved). *Martin Holtmann* has served in an advisory or consultancy role for Lilly, Shire and Medice, and received conference attendance support or was paid for public speaking by Bristol-Myers Squibb, Lilly, Medice, Neuroconn, and Shire. *Aribert Rothenberger* is member of an advisory board and speakers' bureau of Lilly, Shire, Medice and Novartis. He got research and travel support and an educational grant from Shire and research support from the German Research Society. *Paramala Santosh* declares no conflicts of interest. *Cesar Soutullo* has received research funds for Caja Navarra Foundation, Eli Lilly, Lundbeck Shire and TEVA. He has served as Consultant I Advisory Board for Alicia Koplowitz Foundation, Editorial Medica Panamericana, Eli Lilly, Instituto de Salud Carlos III (FIS), NeuroTech Solutions Ltd, Spanish Health Ministry Quality Plan (Clinical Practice Guidelines on TDAH and Clinical Practice Guidelines on Depression), Rubio and Shire. He has served in the Speaker's Bureau/has given talks on Continuous Medical Education (not about a product) for: Eli Lilly, Shire, Universidad Internacional Menendez Pelayo and Universidad Internacional de La Rioja (UNIR). He has received Royalties from DOYMA, Editorial Medica Panamericana, EUNSA, Mayo Ediciones. *Hans Christoph Steinhausen* has worked as an advisor and speaker for the following pharmaceutical companies: Janssen-Cilag, Eli Lilly, Novartis, Medice, Shire and UCB and has also received unrestricted grants for postgraduate training courses or conferences and research by Janssen-Cilag, Eli Lilly, Novartis, Medice and Swedish Orphan International. He receives book

royalties from Cambridge University Press, Elsevier, Hogrefe, Huber, Klett and Kohlhammer Publishers. *Argyris Stringaris* receives grant or research support from the Guy's & St Thomas' Charity, University College London for a joint project with Johnson and Johnson, the Wellcome Trust and the National Institute for Health Research. He also receives royalties from Cambridge University Press for The Maudsley Reader in Phenomenological Psychiatry, and Oxford University Press for Disruptive Mood: Irritability in Children and Adolescents. *Eric Taylor* receives royalties from Blackwell Wiley, Oxford University press, MacKeith Press. *Ian C K Wong* has received grants from European Union FP7 programme, during the conduct of the study; grants from Shire, grants from Janssen-Cilag, grants from Eli-Lily, grants from Pfizer, outside the submitted work; he is a member of the National Institute for Health and Clinical Excellence (NICE) ADHD Guideline Group and acted as an advisor to Shire. *Alessandro Zuddas* has received honoraria for participating to Advisory board or Data Safety Monitoring Boards from Eli Lilly, Otsuka, Lundbeck, Takeda and EduPharma. He has also received royalties from Oxford University Press and Giunti OS, and research grants from Lundbeck, Roche, Shire and Vifor. *Edmund Sonuga-Barke*: Speaker fees, consultancy, research funding and conference support from Shire Pharma. Speaker fees from American University of Beirut, Janssen Cilag, consultancy from Neurotech solutions, Copenhagen University and Berhanderling, Skolerne, KU Leuven. Book royalties from OUP and Jessica Kingsley. Financial support received from Aarhus University and Ghent University for visiting Professorship. Grants awarded from MRC, ESRC, Wellcome Trust, Solent NHS Trust, European Union, Child Health Research Foundation New Zealand, NIHR, Nuffield Foundation, Fonds Wetenschappelijk Onderzoek-Vlaanderen (FWO), MQ – Transforming Mental Health. Editor-in-Chief JCPP supported by a buy-out of time to Kings College London and a personal Honorarium. The remaining authors have declared no other potential or competing conflict of interest. The authors thank the parent support groups and clinicians for their assistance in the process of generating questions of clinical concern for this practitioner review. They also thank Joanna Lockwood and Danielle Beaton for assistance in the preparation of this manuscript.

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Key practitioner message

- On the basis of current evidence that takes into account whether outcomes are blinded, behavioural intervention cannot be supported as a front-line treatment for core ADHD symptoms. However, there is evidence on probably blinded outcomes that behavioural interventions reduce conduct problems in children with ADHD and enhance parenting in parents of children with ADHD.

- Specialised ADHD behavioural interventions do not appear to be more effective than more generic behavioural programmes. There are few contraindications for behavioural interventions. There is no reliable evidence to date to suggest that adding other nonpharmacological interventions to behavioural interventions has benefit.

Areas for future research

- There is a need to enhance the number and quality of studies that use blinded or independent outcomes especially for core ADHD symptoms, but also for comorbid impairment domains.
- More research on moderators of outcome is required to help understand for whom behavioural interventions work best.
- More research on mediators of outcome is required to identify underlying mechanisms of action for behavioural intervention.

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Accepted for publication: 29 August 2017

First published online: 30 October 2017