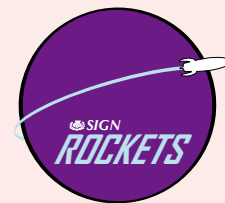


SIGN 112 • Management of attention deficit and hyperkinetic disorders in children and young people

Recommendations Online: Clinical Knowledge Evidence Translation



Diagnostic criteria	Psychological interventions	Principles of intervention
Assessment	Pre-school children	Complementary and alternative therapies
Parent / carer interview	Pre-adolescents	Nutrition
Child / young person interview	Adolescents	
Lab measures and questionnaires	Pharmacological therapy	
Psychoeducational assessment	Psychostimulants	
Clinical examination	Adverse effects of psychostimulants	
Psychiatric assessment	Atomoxetine	
Psychological assessment	Adverse effects of atomoxetine	
	Methylphenidate formulations	

DIAGNOSTIC CRITERIA

The core symptoms of ADHD and HKD comprise developmentally inappropriate levels of:

- inattention (difficulty in concentrating)
- hyperactivity (disorganised, excessive levels of activity)
- impulsive behaviour.

In order to meet diagnostic criteria it is essential that symptoms:

- have their onset before the age of seven years (ADHD) or six years (HKD)
- have persisted for at least six months
- must be pervasive (present in more than one setting, eg at home, at school, socially)
- have caused significant functional impairment
- are not better accounted for by other mental disorders (eg pervasive developmental disorder, schizophrenia, other psychotic disorders, depression or anxiety).

Associated morbidity includes educational underachievement, antisocial behaviour, delinquency and an increased risk of road traffic accidents in adolescence. In addition, there can be a dramatic effect on family life.

ASSESSMENT

- If, on the basis of preliminary assessment, it is suspected that a child or young person has ADHD/HKD associated with significant impairment, referral for specialist assessment by a child and adolescent mental health clinician or paediatrician with a specialist interest in this field is recommended.

PARENT / CARER INTERVIEW

D Parental report of their children's symptoms is an essential component of the diagnostic assessment.

D A history should be obtained of obstetric and perinatal complications.

C A developmental history should be obtained to show a chronological development of difficulties.

- An assessment of family functioning including relationships within the family, communication patterns, parental management styles and the presence of marital conflict or stress should be explored.

CHILD / YOUNG PERSON INTERVIEW

- The child or young person should be engaged in the therapeutic process with an understanding of their perception of their difficulties, the possibilities of treatment and their responsibility in the management of the disorder.

LAB MEASURES AND QUESTIONNAIRES

C Laboratory assessments should not be used routinely.

- Questionnaires are useful in assessment when used in association with information derived from other sources. They can be used as part of the initial assessment as well as for evaluating treatment response.

PSYCHOEDUCATIONAL ASSESSMENT

D An assessment of the child's presentation in their educational placement is important for confirming diagnosis and identifying educational underachievement.

CLINICAL EXAMINATION

Clinical examination of children and young people presenting with ADHD/HKD should include a systems inquiry, details of previous health problems, current drug treatment, and physical examination. Vision and hearing should be assessed and formally tested if indicated.

PSYCHIATRIC ASSESSMENT

Whilst the core assessment for ADHD/HKD can be undertaken by experienced specialists from a variety of backgrounds, assessment by a child and adolescent mental health professional is essential if there is difficulty in differential diagnosis or concern about the existence of comorbid psychiatric disorders.

PSYCHOLOGICAL ASSESSMENT

Psychological tests should not be regarded as a routine part of the diagnostic process. Use of these tests should be on the basis of a specific hypothesis in a specific case.

PRINCIPLES OF INTERVENTION

Parents/carers of children with ADHD/HKD (*and older children with ADHD/HKD*) should be given information about ADHD/HKD and about possible interventions, including their potential risks and benefits.

Consent should be obtained from parents/carers to allow information sharing between all agencies working with children and young people with ADHD/HKD.

There should be regular communication between health and education services to promote understanding of the difficulties of ADHD/HKD, to ensure a consistent approach to the individual across settings and to monitor effectiveness of intervention(s).

Practitioners should be aware of legislation relevant to children with ADHD/HKD including the Education (Additional Support for Learning) (Scotland) Act, 2004, and the Disability Discrimination Act, 2005.

Parents/carers should be informed about potential sources of financial help including Disability Living Allowance.

PSYCHOLOGICAL INTERVENTIONS

PRE-SCHOOL CHILDREN

B Behavioural parent training is recommended for parents of pre-school children with symptoms of ADHD/HKD. This should be delivered by trained facilitators.

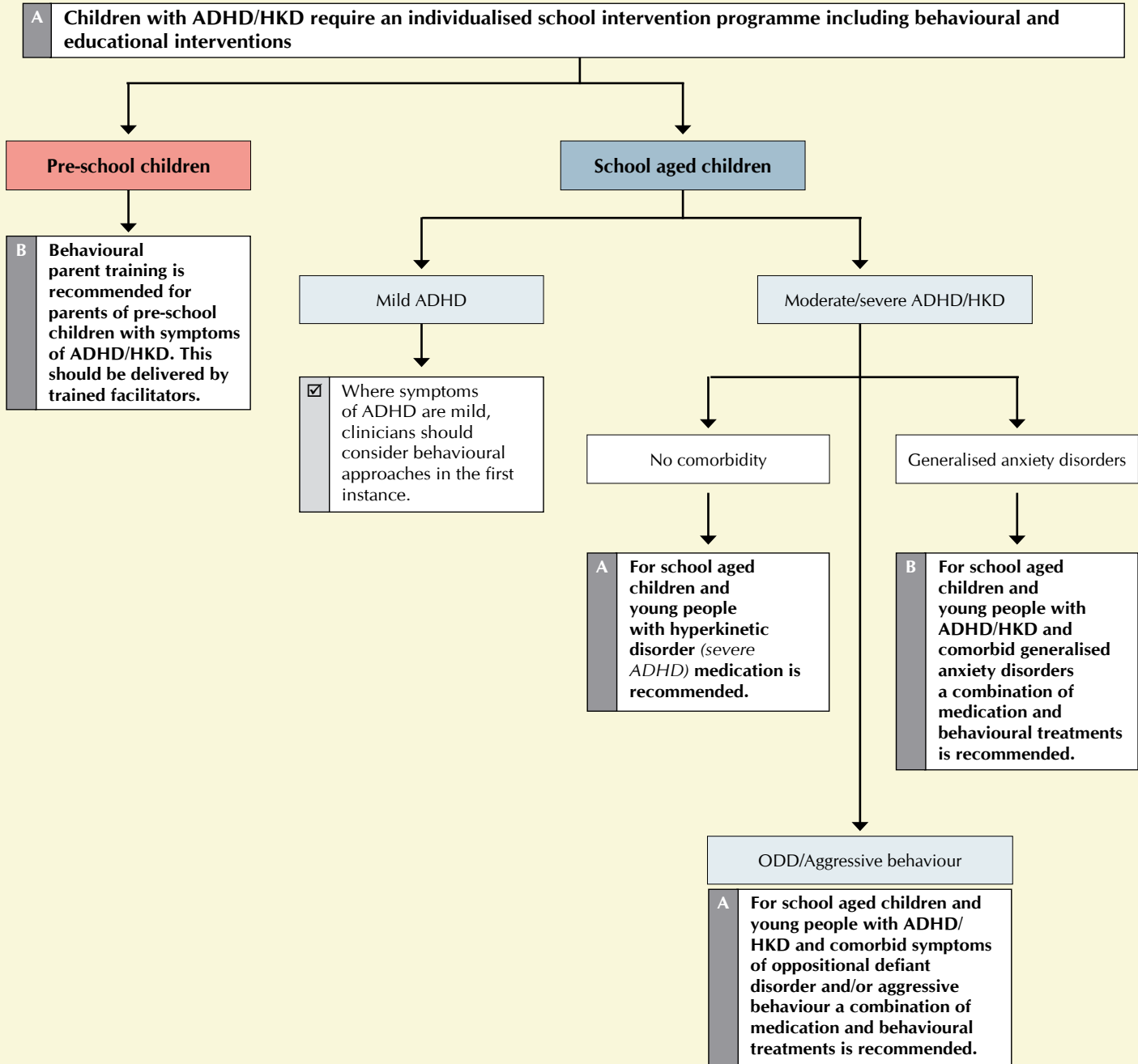
PRE-ADOLESCENTS

A In pre-adolescent children with ADHD/HKD and comorbid symptoms of oppositional defiant disorder and/or aggressive behaviour, behavioural programmes are recommended to treat the comorbid problems.

B In pre-adolescent children with ADHD/HKD and comorbid generalised anxiety, behavioural programmes are recommended to treat the comorbid problems.

ADOLESCENTS

No good quality studies were identified in adolescents; therefore it is not possible to make recommendations for this age group.



- The initiation of pharmacological treatment for children with ADHD/HKD should only be undertaken by a specialist, in either child and adolescent psychiatry or paediatrics, who has training in the use and monitoring of psychotropic medications.
- Baseline physical assessment should be undertaken prior to initiation of pharmacological therapy, including, as a minimum, measurement of pulse, blood pressure, weight and height with the appropriate use of centile charts in all measured parameters. Electrocardiography should be considered on an individual case basis.
- Clinicians should provide information about potential benefits and adverse effects of medications.
- The continuing benefit and need for medication should be assessed at least once per year.
- A shared care protocol should be adopted between primary and secondary care.





A Psychostimulants are recommended as the first choice medication for the core symptoms of ADHD/HKD in children.

Should one psychostimulant fail to be effective, the other should be considered. If one psychostimulant is not tolerated because of adverse effects, atomoxetine should be considered.

A Psychostimulants should not be first line medication for children with ADHD/HKD where there are known (or there is a family history of) cardiac abnormalities.

Psychostimulants are controlled drugs and clinicians should be cognisant with legislation regarding prescribing and dispensing.

Clinicians should:

- follow a structured titration protocol and provide written information on potential adverse effects
- maintain close contact with patients and carers in the initiation and titration phase so that the optimum dose of medication is established
- review at least every six months, including assessment of ongoing efficacy and adverse effects and measurement of growth, pulse and blood pressure (with correct cuff size) using appropriate centile charts.

Management of adverse effects of psychostimulant medications

Adverse effects	Management options
Anorexia, nausea, weight loss, growth concerns	Administer medication with food. Consider dose reduction or omission (eg at weekends). Monitor height and weight using centile charts. Provide dietetic advice; caloric augmentation.
Sleep difficulties* (compare against baseline/ pre-treatment difficulties)	Give 'sleep hygiene' advice. Reduce evening dose or administer earlier in the afternoon. Consider changing to atomoxetine.
Dizziness, headache	May be temporary. If persisting, monitor symptoms and blood pressure carefully, reduce dose or discontinue.
Involuntary movements or tics	Careful monitoring of pre- and post- treatment tics. Apparent worsening or onset may be temporary. If tics persistent or clearly problematic, change to non-psychostimulant alternative.
Dysphoria, agitation	Reduce dose and monitor effect.
Tachycardia, hypertension	Investigate and consider discontinuation or dose reduction.
Syncope suspected to have cardiac origin	Stop medication immediately and seek specialist advice.

*Melatonin is commonly used for sleep disorders in this population but examination of the evidence on melatonin was beyond the scope of this guideline.

ATOMOXETINE



In developing the following recommendations the guideline development group considered both the effectiveness of atomoxetine and potential adverse effects.

A Atomoxetine is recommended as treatment for the core symptoms of ADHD/HKD in children and young people where psychostimulant medication is not appropriate, not tolerated or is ineffective.

When atomoxetine is prescribed, clinicians should review at least six monthly, including assessment of ongoing efficacy and adverse effects and measurement of growth, pulse and blood pressure (with correct cuff size) using appropriate centile charts. Additional monitoring is advised for those at increased cardiovascular risk, hepatobiliary risk, seizure risk and potential for suicidal ideation.

Management of adverse effects of atomoxetine

Side effects	Management options
Anorexia, nausea, weight loss, growth concerns	Gastrointestinal effects may be temporary during first few days of treatment. Administer medication with food. Consider dose reduction. Monitor height and weight using centile charts. Provide dietetic advice; caloric augmentation.
Jaundice, signs of liver disease or biliary obstruction	Stop medication immediately and seek specialist help.
Self harm or suicidal ideation	Monitor for suicidal ideation, clinical worsening of mood and unusual changes in behaviour. New onset of suicidal behaviour should prompt discontinuation of medication pending further assessment.
Somnolence	Administer at a different time of day or reduce dose.
Dysphoria, agitation	Reduce dose and monitor effect.
Tachycardia, hypertension	Investigate and consider discontinuation or dose reduction.
Syncope suspected to have cardiac origin	Stop medication immediately and seek specialist advice.





Name	Product details	Strengths	Formulation	Release profile	Administration details
Generic or branded methylphenidate eg: Ritalin® Equasym® Medikinet®	Immediate release 3-4 hours duration	5 mg 10 mg 20 mg	Tablet	Peak plasma concentration in 1-2 hours.	Tablets can be halved.
Concerta XL®	Modified release 10-12 hours duration	18 mg 27 mg 36 mg 54 mg Dose equivalent: 18 mg = 5 mg IR tds 36 mg = 10 mg IR tds 54 mg = 15 mg IR tds	Capsule shaped tablet containing two layers of drug separated by semipermeable membrane. Outer layer (overcoat) released first, followed by gradual release of drug from inner core. Empty tablet shell excreted.	22% IR:78% MR Initial peak plasma concentration in 1-2 hours. Second peak at 6-8 hours.	Tablet must be swallowed whole, not chewed, crushed or broken.
Equasym XL®	Modified release Up to 8 hours duration	10 mg 20 mg 30 mg	Capsule containing two types of pellets/beads which allow immediate release of drug, followed by gradual release over the day.	30% IR:70% MR Initial peak plasma concentration in 1-2 hours. Second peak at 4.5 hours.	Capsule may be opened and contents mixed with soft foods. (<i>stability unknown</i>) Contents must be swallowed whole, not chewed, crushed or broken.
Medikinet XL®	Modified release Up to 8 hours duration	10 mg 20 mg 30 mg 40 mg	Capsule containing two types of pellets/beads allowing immediate release of half the dose, followed by gradual release over the day.	50% IR:50% MR Initial peak plasma concentration in 1-2 hours. Second phase of drug release 3 hours later resulting in a 3-4 hour plateau.	Capsule may be opened and contents mixed with soft foods. (<i>stability unknown</i>) Contents must be swallowed whole, not chewed, crushed or broken. Ingestion with high fat content food delays absorption by approximately 1.5 hours.

IR = Immediate release, MR = Modified release, tds = three times a day





There is evidence from well controlled studies that some food colourants and preservatives can have adverse behavioural effects on children both in the general population and in those diagnosed with ADHD/HKD.

In two studies in non-clinical populations of children aged three years and eight/nine years, mixed artificial colourants (sunset yellow, tartrazine, carmoisine and ponceau 4R) or the preservative sodium benzoate, or both, exacerbated hyperactive behaviours as rated by parents. The nature of the response is individual and appears to have a pharmacological rather than an allergic mechanism.

A meta-analysis of additive-free diets followed by food challenges in children with hyperactive disorders showed that pathological responses to foods were multiple and idiosyncratic although the most common responses were to the artificial colourant tartrazine and the preservative sodium benzoate.

In a small (n=23) well conducted, placebo controlled RCT of ferrous sulphate supplementation in French schoolchildren with ADHD/HKD who had low ferritin stores but were not clinically anaemic, there were significant decreases in symptom scores over 12 weeks (ADHD/HKD Rating Scale, $p < 0.008$; Clinical Global Impression Scale, $p < 0.01$).

- Avoiding foods and drinks that contain certain artificial colours and/or preservatives may help some children with ADHD/HKD. Parents should be advised to take reasonable steps to limit the number and variety of these in their children's diets, excluding any item that seems to provoke an extreme physical or behavioural reaction.
- Clinicians should consider iron status when taking a history, with measurement of serum iron and ferritin, and treatment, where appropriate.

COMPLEMENTARY AND ALTERNATIVE THERAPIES



There is insufficient evidence on which to base any recommendations for complementary or alternative therapies in the treatment of ADHD.

