

MANAGEMENT of ADHD: PHARMACOLOGICAL and NON-PHARMACOLOGICAL TREATMENT

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Prevalence

- Affects 8–10% school-aged children^{1,2}
 - Diagnosed in boys 3 to 4 times more than in girls³
- Accounts for 30–50% of mental health referrals for children⁴
- Persists in some patients into adolescence and adulthood⁵
 - 40–70% of adolescents^{6,7}
 - Up to 50% of adults^{5,7}

¹ American Academy of Pediatrics. *Pediatrics* 2000;105:1158–1170.

² Barbaresi W, et al. *Arch Pediatr Adolesc Med* 2002;156:217–224.

³ US Department of Health and Human Services. *Report of the Surgeon General*, 1999.

⁴ MTA Cooperative Group. *Arch Gen Psychiatry* 1999;56:1073–1086.

⁵ Mannuzza S, et al. *Arch Gen Psychiatry* 1991;48:77-83.

⁶ Barkley R, et al. *J Am Acad Child Adolesc Psychiatry* 1990;29:546–557..

PRIMARY ADHD

- Hereditary (genetic) in 60-80% of cases
- Imbalance of neuro-transmitters
 - Mainly
 - Dopamine
 - Noradrenalin
- Prefrontal areas

ADHD: Children

Symptoms of Inattention

Compared to children of the same gender and age, children diagnosed with ADHD exhibit excessive symptoms of:

Inattention

- Careless
- Difficulty sustaining attention in activity
- Doesn't listen
- No follow through
- Avoids/dislikes tasks requiring sustained mental effort
- Can't organize
- Loses important items
- Easily distractible
- Forgetful in daily activities

ADHD: Children

Symptoms of Hyperactivity-Impulsivity

Compared to children of the same gender and age, children diagnosed with ADHD exhibit excessive symptoms of:

Hyperactivity

- Squirms and fidgets
- Can't stay seated
- Runs/climbs excessively
- Can't play/work quietly
- "On the go"/"Driven by a motor"
- Talks excessively

Impulsivity

- Blurts out answers
- Can't wait turn
- Intrudes/interrupts others

DSM-V CRITERIA

A. Either (1) and/or (2)

- (1). six (or more) symptoms of **inattention** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level

DSM-V CRITERIA

- (2). six (or more) symptoms of **hyperactivity-impulsivity** have persisted for at least 6 months to a degree that is maladaptive and inconsistent with developmental level

DSM V

- Several symptoms were present before age 12 years
- Several symptoms are present in two or more settings (e.g. at home, school or work; with friends or relatives; in other activities).
- There is clear evidence that the symptoms interfere with, or reduce the quality of social, school or work functioning.

DSM V

Based on combinations of symptoms

- Three presentations of ADHD:
 - ADHD Combined Presentation
 - ADHD Predominantly Inattentive Presentation (“ADD”)
 - ADHD Predominantly Hyperactive – Impulsive Presentation
- Because symptoms can change over time, the presentation may change over time.

Symptoms, Impairments and Functional outcomes

- ADHD is a chronic condition
 - not outgrown
- ADHD is not a ***categorical*** disorder, but a ***dimensional*** disorder – symptoms change over time

Edmund Sanugo-Barke 2007
Hans-Christoph Steinhausen 2006

TREATMENT

TREATMENT

NON-PHARMACOLOGICAL

PHARMACOLOGICAL

Lifestyle changes

Therapy

Stimulants

Non-stimulants

Diet
Supplements

Home

Psychosocial

Neuro-developmental

Methylphenidate

- Methylphenidate prevents the reuptake of Dopamine and Noradrenaline thereby increasing the amount of dopamine and NA in the pre-frontal concentration areas.
- Indirectly increases (*stimulate*) levels of dopamine and NA.
- Controls distractibility, increases cognitive planning and impulse control
- In use for more than 70 years

Stimulants

Preparations

- Ritalin short acting (IR) 10mg
 - Effect after 30 min
 - Lasting 4-5 hours
- Ritalin long acting LA 10, 20, 30, 40 mg
 - Effect after 30-45min
 - Lasting 6-8 hours
- Concerta 18, 27, 36, 54 mg (Neucon, Contramyl XL)
 - Effect after 30-45 min
 - Lasting 12 hours

Stimulants – Side effects

- Headaches
- Abdominal discomfort
- Decreased appetite
- Mood changes – irritability, tearfulness
- Insomnia
- Can increase tics
- Slight increase in BP and heart rate (<5mmHg) (<5 bpm)
- No long-term or persistent side effects

Appetite and growth effects

In cases of appetite reduction:

- Nutrition should be maximized during periods when appetite suppression is not in effect (Breakfast and evening)
- Reduce portions by increasing snack times
- Consider nutritional supplements and meal replacements
- Consider dose reduction, change to alternative agent, medicine holidays for low BMI or short stature.

Long term effects of Methylphenidate in ADHD

- Reduces obesity
- Improves driving ability with less accidents
- Reduces the incidence of SUD
- Reduces the incidence of risky behavior
- Improves sleep quality
- Can be used in tic disorders and epilepsy
- Reduces mortality
- Indirectly reduces depression
- Reduces incidence of suicide and suicidal thoughts
- Reduces the incidence of criminality

ADHD Stimulant Treatment: Safety Profile


- Stimulants have been studied as psychotropic medications since the 1930s¹
- Side effects are generally mild, short-lived, and responsive to dose or timing adjustment^{1,2}
- No consistent reports of behavioral rebound, motor tics or dose-related growth delays have been found in controlled studies^{2,3}
- Tactics exist to deal with side effects such as insomnia and appetite loss¹

¹Greenhill L, et al. *J Am Acad Child Adolesc Psychiatry* 2002;41(2 Suppl):26S–49S.

²American Academy of Pediatrics. *Pediatrics* 2001;108:1033–1044.

³Carlson GA, et al. *J Child Adol Psychopharm* 2003;13(2):137-142

ADHD Affects All Domains of Functioning

Before School	School	After School	Bedtime
Difficulty with: <ul style="list-style-type: none">•Waking up•Getting ready for school•Struggling excessively with parents	<ul style="list-style-type: none">•Lower grades•Lack of focus•Disruptive•Difficulty with friendships	Difficulty with: <ul style="list-style-type: none">• Sports/Clubs• Completing homework•Risky behavior and injuries•Sitting through dinner	Difficulty with: <ul style="list-style-type: none">•Homework•Sibling interactions•Bedtime prep•Settling down and falling asleep
 Continuous symptoms			

Medicine (Drug) Holidays

- Aim is to improve QoL
 - Academical performance
 - Socially acceptable
 - Emotional stable
 - Behavior
- Recommendation of all the guidelines:
 - No medicine holidays.

PHARMACOLOGICAL

Non-stimulants

Atomoxetine (Strattera) (Inir, Atentra)

- Blocks re-uptake of noradrenalin
- Children 6 years 20kg and above up to adults
- 2 -6 (12) weeks for maximum effect
- Lasts 24 hours, given once or twice daily, every day.
- 10, 18, 25, 40, 60 and 80mg
- Dose: Minimum 1.2mg/kg/day

Atomoxetine (Strattera) – Side effects

- Abdominal pain, nausea, vomiting
- Dyspepsia
- Decreased appetite
- Irritability
- Somnolence
- Increase in blood pressure
- Tenderness liver and/or jaundice – liver enzymes
- Suicidal ideation - discontinue

Atomoxetine Child and Adolescent Studies: Conclusions

- Non-stimulant, non-controlled and no evidence of abuse potential
- Has been shown to be comparable to methylphenidate (MPH) on core symptom efficacy in ADHD
- Has been shown to provide continuous symptom relief dosed once-daily
- Has demonstrated long-term sustained effect
- Can improve functional outcomes
- Has been shown to have a beneficial effect on sleep patterns
- Not contraindicated in patients with tics/Tourette's or anxiety

Complimentary and Alternative medicine (CAM)

- ‘Although many individuals, with and without ADHD, report benefits from “brain smart food” such as mentat, zinc, L-carnitine, vit B6, magnesium, ginko balboa, ginseng, passionflower, acetyl L-carnitiene (ALCAR), dimethyl ethanolamine (DMAE), L-theanine, DHA, citocoline, curcumin, phosphatidylserine, vincopetine, L-alpha-glycerylphosphorylcholine, bacopa monnieri and huperzine A, formal studies on the effectiveness of these agents are lacking with no consistent evidence from RCT.’
- Some might be dangerous in children

ADHD: Comorbid Conditions

- **General assessment guidelines**
 - Be aware of the significant occurrence of comorbidities in patients with ADHD
 - Comorbidity is the rule rather than the exception
 - Consider the possible existence of comorbidities when diagnosing ADHD
 - Consider the possible existence of ADHD when diagnosing other conditions
 - Treatment options: offer appropriate treatment options for both ADHD and comorbidities, including counseling/education, behavioral/cognitive/family therapy, pharmacological treatment

¹Greenhill L, et al. *J Am Acad Child Adolesc Psychiatry* 2002;41(2 Suppl):26S–49S.

²American Academy of Pediatrics. *Pediatrics* 2001;108:1033–1044.

ADHD and Comorbidities

Major goal: Improvement of QoL

1. As a rule no medicine holidays
2. Treat the best part of the full day
3. Part of an **Individual support Plan (ISP)**
 - Patient, Parents, teachers, therapists, doctor.

Inter-disciplinary approach

- Medical doctor
 - Developmental pediatrician
 - Psychiatrist
 - Neurologist
- Psychologists
 - Educational
 - Clinical
- Occupational therapists
- Speech therapists
- Physio therapists
- Play Therapists

Psychosocial intervention

Targets for intervention

- Mood disorders / Anxiety
- Anger
- Low self esteem
- Social skills
- Sleep problems
- Relationship issues
- Substance abuse

Psychosocial intervention

- Psycho education
- Family and couples therapy
- Cognitive behavioral therapy
- Parent training
- Dialectical behavioral therapy
- Mindfulness based therapy
- Coaching, including financial management
- Accommodations at work and educational system

PSYCHOEDUCATION

- Psychoeducation of patient, parents and teachers
- Family based psychosocial interventions
 - Behavioral parent training most effective
 - Provides parents with a range of behavior modification techniques based on social learning principles. (Taylor et al, 2004. Pelham and Fabiano, 2008)
- Preschool and school based psychosocial interventions
 - Classroom interventions
 - Academic interventions
- Peer-focused behavioral interventions and social skills training
- Cognitive behavior therapy for the patient - adults

Neuro-developmental therapies

Occupational therapy

- Visual perceptual delays
- Fine and gross motor coordination problems
- Sensory integration problems

Speech therapy

- Audiology
- Language delays
- Auditory processing problems
- Pragmatic language delays

Summary of neuro-cognitive interventions

- Neurofeedback and cognitive training interventions are in the relative early stages of development.
 - Although both seem to alter brain functioning there is insufficient evidence to recommend them as treatments for ADHD per se.
 - Of the two evidence seems more compelling for neurofeedback
- Does changes in neuropsychology relate to changes in symptomatology?

EUROPEAN GUIDELINES

- Severe Hyperactive/Impulsive/Inattentive
 - “Do something now”, poor self esteem, academic failure, always in trouble (Poor QoL)
 - Pharmacological treatment 1st choice, followed by therapy
- Less severe H/I and Inattentive presentations
 - Pharmacological or behavioral treatment or both
- Pharmacological treatment:
 - 1st Choice: Methylphenidate
 - Then Atomoxetine unless specifically indicated

Take home message

- ADHD medication are very effective and relatively safe.
- Limited evidence on efficacy of non-pharma interventions in reducing core symptoms of ADHD, but they may play an important role in treating coexisting disorders and co-morbidities.
- Medication may prevent or at least modulate the development of ADHD-associated psychopathology.

Classroom strategies

- There is no easy solution for the management of the child with ADHD in the classroom, or at home for that matter.
- Teachers know that ADHD often shows up entangled with many other problems such as learning difficulties or mood problems, that the face of ADHD changes like the weather, inconsistent and unpredictable, and that the treatment of ADHD remains a task of hard work and devotion.
- If you look at what some of the experts say a teacher must do for an ADHD child while still having to teach 30 other children asks for a super human being.

Classroom strategies

- First of all, make sure you are dealing with ADHD.
 - Many conditions like allergies, epilepsy, anxiety can mimic ADHD. It is the parents responsibility to make sure the diagnosis is established, but the teacher must and can support the process.
- Build your own support network.
 - Make sure you have the support of the school and parents. Have a knowledgeable person with whom you can consult.
- Know your limits.
 - Ask for help. You as a teacher cannot be expected to an expert on ADHD.

Classroom strategies

- Ask older children what will help.
 - Try to sit down with the older child individually and ask how he or she learns best. These kids are often very intuitive.
- ADHD kids need structure.
 - They need their environment to be structured externally what they cannot do internally. Make lists that they can refer back to.
 - They need previews and repetition.
 - They need direction and limits.

Classroom strategies

- Remember the emotional part of learning
 - These children need special help in finding enjoyment in the classroom, mastery instead of failure and frustration, excitement instead of boredom or fear.
- Post rules.
 - Have them written down and in full view.
- Repeat directions.
 - People with ADHD need to hear the same things more than once.

Classroom strategies

- Make frequent eye contact.
 - You can “bring back” a child with ADHD with eye contact. Do it often.
- Seat the ADHD child near your seat or where you are most of the time.
- Set limits and boundaries.
 - Do it consistently, predictably, promptly and plainly.
 - Don’t get into complicated lawyer-like discussions of fairness – it’s just a diversion. Take charge.

Classroom strategies

- Have as predictable a schedule as possible.
 - If you are going to vary it, as most interesting teachers do, give lot's of warning and preparation.
- Try to help these kids make their own schedules for after school
 - In an effort to avoid one off the hallmarks of ADHD: Procrastination
- Eliminate or reduce the frequency of timed tests.
 - ADHD kids get overwhelmed with anxiety

Classroom strategies

- Allow for escape valve outlets
 - leaving the class for a moment
 - taking something to another teacher
 - cleaning the black board
- Go for quality rather than quantity of homework.
 - As long as they are learning the concepts, they should be allowed this.
- Monitor progress often.
 - ADHD children benefit greatly from regular feedback.

Classroom strategies

- Break down large tasks into small tasks.
 - ADHD kids can do a lot more than they believe they can and often give up easily if the tasks looks to big.
 - With small children this can be extremely helpful in avoiding tantrums.
 - Break down complicated instructions into small pieces.
- You can be playful, unconventional and flamboyant
 - ADHD people love novelty and enthusiasm.
 - Prepare them

Classroom strategies

- Still again, watch out for over-stimulation.
- Seek out and underscore success as much as possible.
 - These kids live with so much failure they need all the positive feedback they can get.
 - Often the most devastating aspect of ADHD is not the ADHD itself, but the secondary damage done to self esteem.
- Make expectations explicit

Classroom strategies

- Memory is often a problem with these kids
 - Especially “active working memory” – the ability to hold and manipulate information in one’s mind while working.
 - Teach them tricks like cues, rhymes, codes, flashcards, pictures, notes, etc.
- Simplify instructions. Simplify choices. Simplify scheduling.
 - The simpler the instruction the more likely it will be comprehended.

Classroom strategies

- Use feedback that helps the child become self-observant.
 - ADHD kids often have no idea how they came across or how they have been behaving.
 - Try to give this information in a constructive way
 - ‘Do you know what you just did?’
 - How do you think you might have said that differently?’
- ADHD children respond well to an immediate reward or punishment system.
 - They don’t understand the delayed debit and credit systems of most schools.

Classroom strategies

- Punishments

- Ignoring – withdrawal of the teachers attention

- Don't ignore aggressive and/or destructive behavior

- Reprimand

- Should be immediate, unemotional, brief and/or backed up with loss of a token or privilege.

- Response cost

- The child may lose a reward as result of inappropriate behavior
 - Sad face instead of a star
 - Or the child just doesn't receive one

Classroom strategies

- **Punishments**

- **Time out**

- Remove child from problem situation
 - Use 3-sided cubicle
 - Facing blank wall
 - Put work away and put head down on desk.

- **Suspension**

- Child is removed from the class according to schools policy

Classroom strategies

- If a child seems to have trouble reading social cues – body language, tone of voice, timing etc.
 - Try discretely to offer specific and explicit advice as a sort of social coaching.
 - “Before you tell your story, ask to hear the other person’s first”
 - “Look at the other person when he’s talking.”
- Teach test taking skills.
- Have a home-to-school notebook.
 - Helps parent-teacher communication

Classroom strategies

- Prepare for unstructured time.
- Praise, approve, encourage, nourish.
- Know that handwriting is difficult for many of these kids.
 - Many have dysgraphia
- Encourage reading aloud at home.
- Always be on the lookout for sparkling moments.
 - They often have a special something

Classroom strategies

- Seat student near a good role model. Have a study buddy.
- Ignore minor inappropriate behavior.
- Allow student to stand at times when working.
 - Especially the hyperactive ones
- Look for opportunities for student to display leadership role in class.
- Recommend accommodations for poor academic skills when needed

Classroom strategies

- Set up goals for academic progress or social behavior with the student and implement a reward program.
- Encourage the child to participate in extracurricular activities at school.
 - Culture or sport
 - Not only good for concentration but enhances self-esteem.
- Encourage child to do revision before submitting academic work

Classroom strategies

- Have them outline, highlight, underline or summarize information that should be remembered.
- The child with sensory processing problems and tactile defensiveness
 - Cannot stand in a queue. Let him/her stand in front or at the back.
- Supervise closely during transition times
 - Changing classrooms

Administration of Medication in Schools.

- Current South African legislation and/or policies do not give clear guidance regarding the management and administration of medication in schools.
- Consequently, policy makers at school level have to rely on their own knowledge and interpretation of general legislation, personal experiences and beliefs to develop appropriate school policies.
- There are no separate policies for the administration of schedule 6 medication such as methylphenidate and we have to rely therefor on general principals.

Administration of Medication in Schools.

- This leaves role-players, e.g. parents, school principals, teachers, house masters and nurses feeling legally vulnerable and with uncertainty regarding the correct way to manage and administer medication in school and hostel environments.
- Schools are urged to develop their own framework and policy, taking into consideration their individual needs, personal structure and resources.
(www.bloubergranthigh.co.za)

General considerations

- As a general rule, but subject to school policy and unless authorized by the school principal, schools are not to administer prescription medication to learners.
- However, the management and administration of medication to learners, while on school premises has become an inescapable reality for schools.
- Many learners with special care needs are now able to attend school because of the effectiveness of their medication at home and at school. The administration of medication during the school day has become essential to allow some learners to attend school and participate in the full range of school activities.

Responsibilities of the Principal

- Must ensure the development, approval, advocacy and enforcement of the school policy on management and administration of medication.
- In schools where professional nurses are employed the responsibility for the management of medication will be taken by her.

Responsibilities of the Principal

- The principal or nurse can designate and delegate to the member(s) of the school personnel willing to assist, the responsibility for the management and administration of medication at school with the necessary training and support and guidance.
- Assistive personnel may include educators, therapists, office personnel (like secretaries) and house mothers.

Prescription medication

- Written consent must be given by the parent for the child to receive the medication at school.
- The parent must provide a copy of the child's prescription to the school. Pharmacy/clinic labels on original medicine containers may serve as proof of the prescription.
- As far as possible, medication sent to school must be in the original packaging.
- Parents should provide sufficient quantities of medication for the period the child will need the medication.

Prescription medication

- All medication must be labelled with the following information: The name and strength of the medication, the name of the child, the dose to be taken, the time medication should be taken and special storage instructions if applicable.
- All medication must be handed in at the school to the principal or his delegate.
- Any medication given on the school premises must be recorded and documented in applicable registers or on applicable forms as determined by the school policy.

Medication errors

- This may include anything that can go wrong, and may include: wrong child, wrong medication, wrong dose, wrong time, not given etc.
- All medication errors must be reported to the principal or professional nurse as soon as possible.
- The possible impact of the error should be determined as well as if any corrective actions are necessary.
- A “Medication Error Incident Report” must be completed.

Children refusing to take medication

- When learner refuses to take his/her medication, he/she should be motivated and taught the benefits of taking medication.
- No physical force must be used to coerce the taking of medication.
- The parent should be informed by the principal or nurse if the child still refuses to take the medication.
- Applicable documentation must be completed for record keeping purposes.

Self medication

- Self medication occurs when a learner, of an appropriate age, with the parents informed consent and permission of the school is allowed to take medication without supervision.
- Self medication applies to learners who, on evaluation by their medical practitioner and parent, and approved by the principal or nurse in consultation with the class teacher, are regarded as being capable of administering their own medication and recognizing signs, symptoms, possible side-effects and adverse responses associated with their condition.