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ADHD Medication Management: Current Practices and Research

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Abstract

Background: Attention-Deficit/Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder characterized by symptoms of inattention, hyperactivity, and impulsivity. Effective medication management is crucial for optimizing treatment outcomes and improving quality of life for individuals with ADHD. This paper provides a comprehensive overview of current practices in ADHD medication management, including licensed treatments in the UK, guidelines from the National Institute for Health and Care Excellence (NICE), and considerations for monitoring and managing treatment.

Methods: The paper synthesises data from recent research and clinical guidelines on ADHD medications. It reviews the pharmacological details of licensed ADHD medications, the NICE 2018 guidelines for treatment in children and adults, and evidence on managing common side effects such as appetite loss and growth delay. The paper also explores the feasibility of using computerised assessments like the QbTest and addresses long-term safety concerns.

Results: Findings highlight the range of licensed ADHD medications available in the UK, including stimulants and non-stimulants, and their respective pharmacological properties. The NICE guidelines offer distinct recommendations for children and adults, emphasising the importance of individualised treatment plans and ongoing monitoring. Evidence from recent studies indicates variability in medication efficacy and tolerability, with recommendations for dose optimisation and management of side effects.

Conclusion: Effective ADHD medication management requires a thorough understanding of available treatments, adherence to clinical guidelines, and careful monitoring of patient responses. The NICE guidelines provide a robust framework for treatment decisions, while ongoing research continues to refine our understanding of medication effects and long-term outcomes. Future studies should focus on further evaluating the long-term impacts of ADHD medications and exploring innovative treatment approaches. (260 words)

Keywords: ADHD, Medication Management, Neuropsychiatry, Efficacy, Tolerability, Nice Guidelines

List of Abbreviations

- ADHD: Attention-Deficit/Hyperactivity Disorder
- NICE: National Institute for Health and Care Excellence
- **MPH:** Methylphenidate
- ATMX: Atomoxetine

- **RCT:** Randomised Controlled Trial
- **QbTest:** Quantified Behavioural Test

Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by persistent patterns of

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inattention, hyperactivity, and impulsivity that interfere with functioning or development [1]. ADHD affects approximately 5% of children and 2.5% of adults worldwide, with symptoms often continuing from childhood into adulthood. It is a heterogeneous disorder with complex aetiology involving genetic, environmental, and neurobiological factors. ADHD is associated with significant impairments in academic, occupational, and social functioning, often leading to lower quality of life and increased risk of comorbid conditions such as anxiety, depression, and substance use disorders.

ADHD is classified into three main presentations: predominantly inattentive, predominantly hyperactive-impulsive, and combined. The presentation can vary across the lifespan, with hyperactive-impulsive symptoms often declining with age, while inattentive symptoms may persist or worsen, particularly affecting academic and occupational performance in adolescents and adults. Diagnosis requires a thorough assessment of symptoms and impairment across multiple settings, with input from parents, teachers, and self-reports playing a critical role [2]. Management of ADHD includes a combination of pharmacological and non-pharmacological approaches tailored to the individual's age, symptom severity, and personal circumstances. The primary goal of treatment is to reduce core symptoms, improve functional outcomes, and enhance the individual's overall quality of life. Pharmacological treatments, particularly stimulant medications, are considered the cornerstone of ADHD management, demonstrating efficacy in reducing symptoms and improving cognitive and behavioral functioning. Non- stimulant medications and behavioral interventions are also integral to comprehensive ADHD care, especially for individuals who do not tolerate or respond to stimulants.

The UK follows guidelines set by the National Institute for Health and Care Excellence (NICE) for the diagnosis and management of ADHD. The NICE 2018 guidelines emphasise a patient- centred approach, incorporating evidence-based recommendations for the use of medications, psychological therapies, and support strategies across different age groups. For children and adolescents, the guidelines prioritise behavioural interventions as the first-line treatment, with medication considered when symptoms are moderate to severe or when non-pharmacological approaches alone are insufficient. In adults, pharmacological treatment is often the first line, supplemented by psychological interventions such as Cognitive Behavioural Therapy (CBT) to address residual symptoms and improve coping skills [3].

Despite the availability of effective treatments, ADHD remains underdiagnosed and undertreated, particularly in adults. The stigma associated with the disorder, misconceptions about its legitimacy, and the challenges in accessing specialised care contribute to delays in diagnosis and treatment. Additionally, there is variability in the implementation of guidelines and treatment practices across regions and healthcare settings, further complicating the management of ADHD. Addressing these barriers requires a concerted effort to raise awareness, improve diagnostic accuracy, and ensure that individuals with ADHD receive timely and appropriate care.

This paper provides a comprehensive review of licensed ADHD medications in the UK, examining their pharmacological pro-

files, mechanisms of action, and clinical considerations. It also explores the NICE 2018 guidelines for ADHD management, highlighting the recommended approaches for children, adolescents, and adults. By synthesising current knowledge and clinical guidelines, this paper aims to support healthcare professionals in optimising ADHD care and improving patient outcomes [4].

Licensed ADHD Medications in the UK

ADHD medications licensed in the UK are primarily categorised into stimulant and non-stimulant classes. These medications differ in their mechanisms of action, release profiles, and pharmacokinetic properties, making the selection of the appropriate medication an individualised process. Below is an overview of the commonly used medications, including their pharmacological details.

Methylphenidate (MPH) Mechanism of Action

Methylphenidate is a central nervous system (CNS) stimulant that primarily acts by inhibiting the reuptake of dopamine and norepinephrine in the brain, leading to increased synaptic concentrations of these neurotransmitters. This effect enhances attention, reduces hyperactive behaviour, and improves impulse control [2].

Pharmacokinetics

- **Absorption:** Methylphenidate is rapidly absorbed, with peak plasma concentrations occurring within 1 to 3 hours for immediate-release formulations. Modified-release formulations provide extended plasma concentrations over 8 to 12 hours, reducing the need for multiple daily dosing [2].
- **Metabolism:** Primarily metabolised by de-esterification to ritalinic acid, which has little or no pharmacologic activity. Methylphenidate is minimally metabolised by the cytochrome P450 system [2].
- **Elimination:** Excreted mainly via the urine, with a half-life of approximately 2 to 3 hours for immediate-release forms [2].

Formulations

- Immediate-Release (IR): Tablets with a duration of action of 3-5 hours, requiring multiple doses per day [2].
- Modified-Release (MR): Includes long-acting tablets and capsules (e.g., Concerta XL, Equasym XL, Medikinet XL) that provide therapeutic effects lasting 8 to 12 hours [2].

Side Effects

Common adverse effects include insomnia, appetite suppression, weight loss, abdominal pain, and headaches. Long-term use is associated with growth suppression, which is dose-dependent and more pronounced during the first few years of treatment [2].

Lisdexamfetamine Dimesylate (LDX) Mechanism of Action

Lisdexamfetamine is a prodrug of dextroamphetamine, which becomes pharmacologically active after conversion in the body. It promotes the release of norepinephrine and dopamine from presynaptic nerve terminals and inhibits their reuptake, enhancing concentration and impulse control [3].

Pharmacokinetics

 Absorption: LDX is absorbed through the gastrointestinal tract and is converted to active dextroamphetamine primarily in the blood, independent of gastrointestinal pH. Peak plasma levels of dextroamphetamine are reached approxi-

- mately 3.5 hours post-dose [3].
- Metabolism: LDX is enzymatically converted to dextroamphetamine, bypassing hepatic metabolism initially, which reduces variability in drug levels [3].
- Elimination: Excreted primarily as unchanged drug and metabolites via the urine, with a half-life of 10-13 hours [3].

Formulations

- Capsules and Chewable Tablets: Designed to provide a prolonged action of up to 13 hours, making them suitable for once-daily dosing [3].
- **Side Effects:** Common side effects include decreased appetite, insomnia, dry mouth, and irritability. Cardiovascular effects, such as increased heart rate and blood pressure, are notable and require monitoring, especially in individuals with underlying conditions [3].

Dexamfetamine Sulfate Mechanism of Action

Dexamfetamine is a potent CNS stimulant that acts similarly to other amphetamines by increasing the release of dopamine and norepinephrine from their synaptic vesicles and inhibiting their reuptake, resulting in heightened attention and decreased hyperactivity [4].

Pharmacokinetics

- **Absorption:** Rapidly absorbed with peak plasma concentrations reached within 1 to 2 hours post-dose [4].
- **Metabolism:** Primarily metabolised in the liver by cytochrome P450 enzymes, with significant interindividual variability in metabolism rates [4].
- **Elimination:** Excreted primarily in the urine, with a half-life of approximately 10-12 hours [4].

Formulations

- Immediate-Release Tablets and Oral Solution: Typically administered 1-3 times daily due to a shorter action span (4-6 hours), often used when longer- acting formulations are unsuitable [4].
- Side Effects: Includes appetite loss, insomnia, and potential for dependence with prolonged use. Monitoring of cardiovascular status and growth is recommended during treatment [4].
- Atomoxetine Mechanism of Action: Atomoxetine is a selective norepinephrine reuptake inhibitor (NRI), which increases norepinephrine concentrations in the prefrontal cortex, a brain region implicated in ADHD symptoms. Unlike stimulants, atomoxetine does not have a direct effect on dopamine neurotransmission, which contributes to a different side effect profile [5].

Pharmacokinetics

- **Absorption:** Well, absorbed with peak plasma concentrations occurring within 1 to 2 hours [5].
- Metabolism: Primarily metabolised by the CYP2D6 enzyme. Individuals who are poor metabolisers of CYP2D6 experience higher plasma concentrations and a longer half-life [5].
- Elimination: Excreted mainly in the urine, with a half-life of approximately 5 hours in extensive metabolisers and up to 24 hours in poor metabolisers [5].

Formulations

- Capsules: Typically taken once or twice daily, with effects persisting throughout the day without pronounced peaks, which helps reduce the risk of abuse [5].
- Side Effects: Side effects include nausea, fatigue, mood swings, and an increased risk of suicidal thoughts in children and adolescents. Growth delay and gastrointestinal symptoms are common, particularly during the initial months of treatment [5].

Guanfacine Hydrochloride Mechanism of Action

Guanfacine is an alpha-2 adrenergic receptor agonist that works by modulating noradrenergic transmission in the prefrontal cortex. This action helps enhance working memory, attention, and impulse control [6].

Pharmacokinetics

- **Absorption:** Well, absorbed with peak plasma concentrations occurring around 5 hours after administration [6].
- **Metabolism:** Primarily metabolised in the liver, involving multiple CYP enzymes including CYP3A4 [6].
- Elimination: Excreted mainly via the urine, with a half-life of approximately 17 hours, supporting once-daily dosing [6].

Formulations

• Extended-Release Tablets (Intuniv): Designed for once-daily dosing, with effects lasting 24 hours, providing an alternative for those intolerant to stimulants [6].

Side Effects

Side effects include sedation, hypotension, bradycardia, and gastrointestinal symptoms. Due to its sedative effects, it is often recommended to administer the medication at night [6].

NICE 2018 Guidelines for ADHD Treatment

The NICE (National Institute for Health and Care Excellence) 2018 guidelines for ADHD provide comprehensive recommendations for the diagnosis and management of ADHD across different age groups, including children, adolescents, and adults. These guidelines emphasise a multi-disciplinary approach and individualised care, integrating both pharmacological and non-pharmacological interventions based on the patient's age, symptom severity, and response to treatment [4].

ADHD Treatment in Children and Adolescents Diagnosis and Assessment:

- ADHD diagnosis in children and adolescents should involve a comprehensive assessment by a specialist, including interviews with the child, parents, and teachers. The evaluation should consider the child's developmental history, behaviour in various settings, and coexisting conditions.
- Rating scales and standardised tools, such as the Conners' Rating Scales and the ADHD Rating Scale IV, may be used to support the diagnosis.

Non-Pharmacological Interventions

- Psychoeducation: Providing information to the child, parents, and teachers about ADHD, its impact, and management strategies.
- **Behavioural Therapy:** Recommended as the first-line treatment for preschool-aged children (under 5 years) and can be

- used alongside medication in older children. This includes parent-training programs, school-based interventions, and cognitive- behavioural strategies aimed at improving social skills, organisation, and emotional regulation.
- Environmental Modifications: Adjustments in the classroom, such as seating arrangements, individualised teaching strategies, and structured routines, can significantly enhance the child's ability to manage symptoms.

Pharmacological Interventions

- **First-Line Medication:** Methylphenidate is the recommended first-line medication for children over 5 years old with moderate to severe ADHD. It is typically introduced after a trial of behavioural interventions unless the symptoms are causing significant impairment.
- Second-Line Medications: If Methylphenidate is ineffective or causes unacceptable side effects, Lisdexamfetamine or Dexamfetamine may be considered. These stimulants are generally preferred due to their efficacy in improving core ADHD symptoms.
- Non-Stimulant Options: Atomoxetine or Guanfacine are recommended when stimulant medications are contraindicated, not tolerated, or ineffective. These options may be particularly suitable for children with a history of substance misuse, anxiety disorders, or tics.
- Medication Monitoring: Regular monitoring of growth, appetite, cardiovascular status, and mental health is advised during treatment. Medication effectiveness should be regularly reviewed, and dose adjustments should be made based on symptom control and side effects.

Special Considerations

- **Titration and Review:** Medication should be titrated slowly, with careful observation of side effects. Follow-up appointments should be frequent during the initial phase of treatment, with ongoing reviews every 3 to 6 months once stabilised.
- Transition to Adult Services: Adolescents with ongoing symptoms should be referred to adult ADHD services well in advance of their 18th birthday to ensure continuity of care.

ADHD Treatment in Adults Diagnosis and Assessment

- ADHD in adults should be diagnosed by a specialist in adult psychiatry with expertise in ADHD. The assessment should consider a detailed history of childhood symptoms, current symptomatology, and functional impairment in various settings.
- Self-reported rating scales, such as the Adult ADHD Self-Report Scale (ASRS), and clinical interviews are commonly used in conjunction with collateral information from partners, family, or colleagues.

Non-Pharmacological Interventions

- Psychoeducation: Essential for helping adults understand their condition, develop coping strategies, and engage effectively in treatment. This may include lifestyle advice, time management techniques, and organisational skills training.
- Cognitive Behavioural Therapy (CBT): CBT specifically tailored for adults with ADHD is recommended to address

- cognitive distortions, emotional dysregulation, and behaviour patterns that contribute to difficulties in daily functioning. This approach is particularly beneficial for managing comorbidities such as anxiety or depression.
- Coaching and Support Groups: ADHD coaching and peer support groups provide practical advice and emotional support, enhancing self-management and reducing the sense of isolation.

Pharmacological Interventions

- **First-Line Medication:** Lisdexamfetamine is recommended as the first-line treatment for adults with moderate to severe ADHD. If Lisdexamfetamine is unsuitable, Methylphenidate can be considered as an alternative.
- Second-Line Medications: Atomoxetine is recommended if stimulants are ineffective, not tolerated, or contraindicated due to coexisting conditions such as anxiety, substance misuse, or cardiovascular risks.
- **Dexamfetamine:** May be considered for adults who have benefited from Lisdexamfetamine but require a shorter duration of action or more flexible dosing.
- Medication Monitoring: Regular assessment of cardiovascular health, potential side effects, and treatment efficacy is essential. Adjustments should be based on symptom control and tolerability, with ongoing monitoring every 6 months or as clinically indicated.

Special Considerations

- Coexisting Conditions: Treatment should be tailored to consider co-occurring conditions such as mood disorders, anxiety, or substance misuse, which may require concurrent management.
- Driving and Occupational Impact: Individuals should be informed of the potential effects of ADHD and its treatment on driving and job performance, with appropriate guidance and adjustments recommended to ensure safety and compliance with legal standards.

Monitoring and Management

Effective monitoring and management of ADHD medications are critical to maximizing treatment benefits while minimizing potential adverse effects. Regular monitoring allows for timely adjustments to the treatment regimen, addressing issues such as side effects, adherence, and the evolving needs of the patient. The National Institute for Health and Care Excellence (NICE) and other international guidelines recommend a structured approach to monitoring, focusing on the patient's overall well-being, symptom control, and any emerging complications related to treatment [1]. Key aspects of monitoring include the assessment of appetite, growth, cardiovascular parameters, and mental health, with strategies tailored to individual needs.

Monitoring Appetite, Weight, Height, and BMI

One of the most common side effects of ADHD medications, particularly stimulants, is a reduction in appetite, which can subsequently lead to weight loss and growth delays in children and adolescents [2]. Monitoring appetite, weight, height, and Body Mass Index (BMI) is crucial, especially during the early phases of treatment when the risk of these effects is highest [3].

Frequency of Monitoring: It is recommended to assess

- weight, height, and BMI at baseline, then at least every six months. For children and adolescents, more frequent monitoring may be necessary during periods of rapid growth or when adjusting medication doses [2].
- Baseline Measurements: Establishing pre-treatment growth data helps differentiate between medication-related effects and underlying growth patterns. This baseline can guide clinicians in detecting significant deviations that may warrant intervention [3].
- Appetite Assessment: Routine questions about eating habits, meal frequency, and changes in appetite should be part of follow-up visits. Specific attention should be given to differentiating between pre-existing eating difficulties and those induced by medication [2].

Management Strategies

- **Timing of Medication:** Administering medication after meals can help reduce the impact on appetite [4].
- **Dietary Adjustments:** Encouraging high-calorie snacks, nutrient-rich foods, and late evening meals can help mitigate weight loss [4].
- Medication Holidays: Periodic breaks from medication, such as on weekends or during school holidays, may help to mitigate growth suppression, although this approach should be carefully weighed against the potential for symptom recurrence [4].
- **Dose Adjustment or Switching Medications:** If significant growth delay is observed, reducing the dose or switching to an alternative medication with a more favourable side effect profile may be considered [5].
- Cardiovascular Monitoring: ADHD medications, particularly stimulants, can affect cardiovascular parameters, including increased heart rate and blood pressure [6]. While the overall risk of severe cardiovascular events is low, ongoing monitoring is essential, especially for individuals with pre-existing cardiovascular conditions or risk factors [7].
- Baseline Cardiovascular Assessment: Before initiating ADHD medication, it is recommended to perform a thorough cardiovascular assessment, including a family history of heart disease, personal history of syncope, palpitations, or unexplained chest pain, and measurement of baseline blood pressure (BP) and heart rate (HR) [6].
- Ongoing Monitoring: BP and HR should be monitored at baseline, after dose changes, and periodically during treatment, typically every three to six months. More frequent monitoring may be required if abnormalities are detected [7].

Management of Cardiovascular Side Effects

- **Mild Elevations:** For mild increases in BP or HR, monitoring may be intensified without immediate cessation of medication. Lifestyle modifications, such as dietary adjustments and exercise, may be recommended [7].
- Significant Elevations: For significant cardiovascular changes, consider dose reduction, switching to a non-stimulant medication, or referral to a cardiologist for further evaluation [6].
- Severe Symptoms or Events: If severe cardiovascular symptoms or events occur, immediate discontinuation of the medication is warranted, with prompt referral to specialist care [7].
- Monitoring Mental Health and Behavioural Changes:

- ADHD medications can influence mood, behaviour, and mental health. Stimulants, in particular, may exacerbate anxiety, agitation, or depressive symptoms in some individuals, while non-stimulants like atomoxetine have been associated with an increased risk of suicidal ideation in rare cases [8].
- Baseline Mental Health Screening: A comprehensive mental health evaluation should be conducted before starting medication, including an assessment for comorbid conditions such as anxiety, depression, and behavioural disorders [8].
- Ongoing Monitoring for Psychiatric Symptoms: Regular assessments for changes in mood, anxiety levels, sleep disturbances, and any emergence of suicidal thoughts are crucial, particularly during the initial months of treatment or after dose adjustments [8].

Management of Adverse Psychiatric Effects

- **Mild Symptoms:** Mild changes in mood or behaviour can often be managed with dose adjustments, additional behavioural support, or short-term counselling [9].
- Severe Symptoms: If significant psychiatric symptoms develop, consider reducing the dose, switching to a different class of medication, or incorporating adjunctive psychological therapies. For cases involving suicidal ideation, immediate action, including cessation of the medication and urgent referral to mental health services, is necessary [9].
- Monitoring Drug-Drug Interactions: ADHD medications can interact with other prescribed drugs, over-the-counter medications, and even certain foods, potentially altering their efficacy or increasing side effects [10]. Monitoring for drug interactions is vital, particularly for patients taking multiple medications [11].
- Common Interactions: Medications that are CYP2D6 inhibitors (e.g., fluoxetine, paroxetine) can increase the levels of atomoxetine, necessitating dose adjustments [10]. Stimulants can also interact with drugs that affect BP and HR, such as antihypertensives and antipsychotics [10].
- Management of Interactions: Regularly review all medications the patient is taking. If an interaction is identified, consider dose adjustments, alternative treatments, or additional monitoring as appropriate [11].
- Regular Follow-up and Collaborative Care: Effective management of ADHD requires ongoing communication between the healthcare provider, patient, and caregivers. Regular follow-up appointments allow for monitoring the overall impact of the medication on ADHD symptoms and daily functioning [12].
- Structured Follow-up Schedule: Establish a follow-up schedule that includes medication reviews, assessments of side effects, and evaluations of academic, occupational, and social functioning. Frequency may vary depending on the patient's response and any emerging concerns [12].
- Collaborative Approach: Engage caregivers, teachers, and other healthcare providers in the monitoring process to gather a comprehensive view of the patient's progress and challenges. A multidisciplinary approach enhances the overall management plan and supports the individual's long-term success [12].

Discussion

The management of ADHD with pharmacological treatments, guided by evidence-based protocols such as those set out by the National Institute for Health and Care Excellence (NICE), plays a critical role in enhancing the quality of life for individuals with ADHD across all age groups. The effectiveness of ADHD medications—stimulants like methylphenidate and lisdexamfetamine, and non-stimulants like atomoxetine and guanfacine—has been well- established in improving core symptoms of inattention, hyperactivity, and impulsivity. However, the benefits of these medications must be carefully weighed against the potential risks, which necessitates comprehensive and ongoing monitoring.

The NICE 2018 guidelines provide a structured framework for the treatment of ADHD in both children and adults, emphasising a patient-centred approach that includes individualised treatment plans, regular reviews, and a strong emphasis on shared decision-making between clinicians, patients, and families. The guidelines advocate for a stepped-care approach that begins with behavioural interventions, reserving pharmacotherapy for more severe cases or when other strategies are insufficient. Importantly, the recommendations highlight the need to tailor interventions according to the developmental stage and specific needs of the patient, recognising that ADHD is a lifelong condition with varying presentations across the lifespan.

Monitoring and management strategies are integral to safe and effective ADHD treatment, with a focus on mitigating side effects, ensuring medication adherence, and optimising outcomes. Key areas of monitoring include growth, appetite, cardiovascular health, and mental health, with tailored approaches to address any issues that arise. Regular assessments allow clinicians to adjust treatment as needed, reducing dosages, switching medications, or incorporating non-pharmacological strategies to better meet the patient's needs. A holistic approach to ADHD management that integrates medication with psychosocial support, educational interventions, and lifestyle modifications is essential. Comprehensive care models that include cognitive-behavioural therapy (CBT), family education, and school-based accommodations can significantly enhance the therapeutic impact of medications, particularly for children and adolescents. For adults, workplace adjustments and support with daily living skills play an equally important role.

ADHD frequently coexists with other conditions such as anxiety, depression, and learning disabilities, which can complicate treatment. Effective management requires a multidisciplinary approach that not only addresses ADHD symptoms but also considers the broader context of each individual's mental health and well-being. Tailoring interventions to account for these comorbidities ensure a more comprehensive approach that goes beyond symptom control to enhance overall functioning and quality of life.

Collaboration between healthcare providers, educators, caregivers, and patients is crucial for successful ADHD management. Regular communication and coordination among these stakeholders can provide a consistent and supportive environment that reinforces the therapeutic goals. Engaging patients and families in the decision-making process fosters adherence to treatment plans and encourages a proactive approach to managing ADHD. The evolving landscape of ADHD treatment continues to benefit

from ongoing research and innovations in pharmacological and non-pharmacological therapies. Future directions may include the development of new medications with improved efficacy and safety profiles, as well as advancements in digital health technologies that can enhance monitoring and patient engagement. Personalised medicine approaches, including genetic testing and biomarkers, hold promise for refining treatment choices to better suit individual patients.

Conclusion

The effective management of ADHD requires a dynamic and individualised approach that combines medication with ongoing monitoring, behavioural interventions, and collaborative care. Adherence to guidelines such as those from NICE ensures that treatment is safe, evidence-based, and responsive to the unique needs of each patient. By prioritising a holistic and patient-centred approach, clinicians can help individuals with ADHD achieve meaningful improvements in their daily lives, fostering long-term success and well-being.

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