

2. Background

2.1 Adult ADHD and the controversy

Adult ADHD is a relatively recent concept, being first described in the literature in the 1970s.¹² While authors have demonstrated the validity of the disorder in adults,^{13,14} and research into the disorder forges ahead, ADHD in adults continues to be controversial. In a study published as recently as 2000, one in eight psychiatrists surveyed in a region of the United Kingdom indicated that adult ADHD does not exist.¹⁵

Adult ADHD is controversial for several reasons:

- High rate of self-diagnosis.

Adults who present to doctors for assessment are often self-referrals. They commonly seek help because they have difficulty persevering with organised tasks, they frequently change jobs or have difficulties at work, they complain of losing things, they complain of being impolite because they frequently interrupt others, and they complain of a lack of concentration when reading. They may have had a child recently diagnosed and treated and, noting similar problems to their children in themselves, they seek evaluation. Sometimes publicity about ADHD leads an individual to seek assessment.^{3,16} It has been reported that as many as one-third of adults who request an evaluation for ADHD are not formally diagnosed with the disorder.¹⁷

- Difficulties in establishing childhood onset of the disorder.

As discussed later (see Part 2.2), a diagnosis of ADHD in an adult requires that the symptoms date from childhood, specifically prior to the age of seven years. It can be difficult to obtain an accurate history from an adult patient to establish childhood onset. Ideally, information from the patient and informants, such as parents and teachers should be obtained. However, this is not always possible or practical, leaving clinicians to rely on patients' own accounts of their symptoms. Investigations into just how accurately adults are able to recall childhood behaviour have produced somewhat inconsistent findings.¹⁸⁻²⁰

- Problems with differential diagnosis.

The symptom of disturbed attention is associated with many psychiatric disorders, such as antisocial personality disorder, bipolar disorder, depression, and substance abuse disorders. In addition to this, many ADHD patients present as depressed, anxious, and irritable. It is difficult for clinicians to decide whether symptoms are due to ADHD or another disorder.^{16,21}

- Stimulants, the main mode of treatment, are restricted substances that may be abused.

Reports from time to time of stimulants being used illegally, and the potential for stimulants to be abused, cause alarm among the community and clinicians alike. Certain clinicians are reluctant to prescribe stimulants because of their potential for abuse.²² Some surveys have shown that less than half of psychiatrists prescribe stimulants to their adult patients.^{15,23}

2.2 Diagnosis and assessment

Many experts agree that ADHD is a neurodevelopmental disorder caused by a complex combination of genetic, biological and environmental factors. For example, studies of twins and families indicate that ADHD is highly heritable.^{24–27} Support for a strong genetic component also comes from gene studies. These studies have identified a number of genes, particularly of the dopaminergic pathway, that may increase the risk of developing ADHD.²⁸ Despite these advances in research, there is no single diagnostic test available for ADHD.

Establishing whether an adult has ADHD requires comprehensive assessment. The key components include:^{2,29,30}

- review of the patient's current concerns;
- review of the patient's history, especially their childhood history;
- review of any retrospective rating scales, school reports, academic records, or other relevant historical records;
- completion of standardised ADHD rating scales (for example: Wender Utah Rating Scale, the Connors Adult ADHD Rating Scale, and the Brown Attention-Deficit Disorder Scales);^{31–33}
- assessment of coexisting or comorbid conditions;
- urine screening, if indicated, due to comorbid substance abuse;
- screening for physical disorder, if indicated.

Brain imaging, electrophysiological assessment and neuropsychological assessment are not integral to diagnosis but may be useful in some circumstances.^{34–36}

The diagnostic criteria for ADHD recommended for use in Australia are the criteria of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*.^{37,38}

The original DSM criteria for ADHD were developed around the notion of ADHD as a childhood disorder. Although the DSM has evolved over time to acknowledge that symptoms persist into adulthood, the current version, DSM-IV, does not specifically define the adult syndrome.

The DSM-IV criteria for ADHD include a list of 18 symptoms, organised into two categories: one with nine inattentive symptoms and a second with nine hyperactive–impulsive symptoms. The symptom descriptions are less child-oriented than previous versions of the DSM, but still tend to reflect presentations in children. An adult can be diagnosed with ADHD-inattentive subtype if they report at least six of the nine inattentive symptoms. If they report six or more of the nine hyperactive–impulsive symptoms they can be diagnosed ADHD-hyperactive–impulsive subtype. An adult who meets both categories is classified as having ADHD-combined subtype. The DSM-IV also includes a category called 'Partial Remission', for individuals who have symptoms that no longer meet full criteria.

It has been suggested that the diagnostic thresholds set for the symptoms lists may be inappropriate for older adolescents and adults, and that the number of symptoms required for diagnosis may be too high. With respect to adults aged 50 years or over, for example, lowering the cut-off to as few as three items on each symptom list is reported to be still valid.³⁹

The DSM-IV criteria require that some of the symptoms were present prior to the age of seven years and were significant enough to cause impairment. As discussed earlier, this often means relying on adults' recall of their childhood behaviour. Where possible, information from other sources, such as parents, should be collected.

Under the DSM-IV criteria, the symptoms must not be transient and must be present in more than one setting (for example, at home and at work). In addition to asking patients about their functioning in different settings, information from other relevant individuals (such as a spouse, parent, or employer) or sources (such as a job appraisal), can be considered.

In addition to a set of symptoms, the patient must have associated impairment to qualify for a diagnosis of ADHD. The DSM-IV stipulates that clinically significant impairment must occur in social, academic or occupational functioning. Examples might include an inability to hold a job, marital problems, frequent problems with friends, failing coursework, or poor money management.

Finally, DSM-IV criteria require that the patient's symptoms are not better accounted for by another mental disorder such as mood disorder, anxiety disorder, or do not occur exclusively during the course of pervasive developmental disorder, schizophrenia, or other psychotic disorder. As mentioned earlier, determining whether a patient's symptoms are due to ADHD or some other disorder can be difficult.

Comorbidity in adults with ADHD, like children with ADHD, is fairly common. Research findings indicate that adults with ADHD have higher rates of antisocial behaviour and substance use disorders than adults without ADHD. Mood disorders (major depression, bipolar disorder, dysthymia) and anxiety are also relatively common among adults with ADHD.^{10,40,41}

2.3 Prevalence of ADHD among adults

Epidemiological data on the prevalence of adult ADHD in the community are not available. The prevalence can only be estimated using information on the prevalence of the disorder in children and information about the degree to which the disorder persists into adulthood.

A number of studies have reported that a proportion of children with ADHD go on to experience symptoms of ADHD as adults. Symptoms of inattention are more persistent than those of hyperactivity and impulsivity, which tend to decline at a higher rate and at an earlier age than inattention symptoms.⁴²

The reported rates of persistence vary considerably, ranging from four per cent to 66 per cent.⁴³⁻⁴⁵ Variation in these rates may be due to differences in selection criteria used in the studies, differences in the duration of follow-up, the age of the samples, the definitions of symptom persistence (or symptom remission) used in the studies, and reporter effects (for example, whether symptoms were based on self-reports or the reports of others). It should be noted that reported rates of persistence to date have mostly been obtained from samples of hyperactive males. The rate of persistence for other children with ADHD, including those with the inattentive subtype, and females, may be different.

The proportion of children who go on to experience symptoms to a degree sufficient to warrant diagnosis as adults based on DSM-IV criteria may be quite low. This does not mean that only a small proportion will experience any

impairment. To use Barkley's words 'a child may outgrow the DSM criteria but not necessarily outgrow the disorder'.⁹

On the available evidence, it can be argued that about 50 per cent of children experience continuation of mild or severe disabling symptoms into adulthood.^{44,46} If the rate of prevalence of ADHD among children is conservatively taken as four per cent and symptoms abate in about 50 per cent of cases, the prevalence rate for adult ADHD approximates two per cent.

Overall, there is relatively little published about sex differences in adults with ADHD. In the absence of epidemiological data, information about differences between adult males and females with ADHD have largely relied on clinical populations.

As is the case for children and adolescents with ADHD, males outnumber females among adults with the disorder. However, the ratio of males to females is somewhat smaller among adults than that seen for children and adolescents. The difference in gender representation between ADHD populations of children and adults that have been studied may be due to referral bias (boys are more likely to be noticed and referred for assessment and treatment because of elevated rates of disruptive and defiant behaviour compared with girls), social factors (for example, women may be more willing to recognise a problem and seek treatment than men),⁴⁷ biological factors (such as distinct brain mechanisms),^{48,49} or a combination of these factors.

For women, the experience of ADHD is reportedly somewhat different to that of their male counterparts. They appear to experience more psychological distress than men with ADHD and have a lower self-image compared to men with ADHD.⁵⁰ Although women and men have a similar rate of mood and anxiety disorders, women with ADHD have lower rates of antisocial disorders than men with ADHD.⁵¹

2.4 Treatment of adult ADHD

Because ADHD is a chronic disorder, most patients need long-term treatment. Treatment should be tailored to meet the individual needs of the patient. It is standard practice to provide psychoeducational treatment to patients. This includes educating the patient about how their symptoms influence their behaviour, the aetiology of their disorder, providing appropriate reading material on ADHD and information about treatment options and their respective benefits and disadvantages. The choice of intervention strategy will be influenced by comorbidity, target symptoms, and strengths and weaknesses of the patient.²⁹

There is little published literature on the relative effectiveness of different treatment strategies for adult ADHD. Medication is mainly used to treat ADHD because it benefits a large proportion of sufferers and it does so in a relatively short period of time.

2.4.1 Stimulants

Stimulant treatment is regarded as first-line pharmacological treatment for ADHD. The stimulant drugs available for this purpose in Australia are methylphenidate and dexamphetamine. In Australia, as well as overseas, the last two decades have seen a marked increase in the prescription of stimulants.⁵²⁻⁵⁴ From 1990 to 2000 in NSW, the rate of stimulant treatment for children with ADHD increased about

nine-fold. About one per cent of children were being treated with stimulant medication for ADHD at the end of 2000.⁵⁵ Rates of stimulant treatment have been shown to vary according to the patient's age and sex, region, socioeconomic factors, and prescriber factors.⁵⁵⁻⁶²

While published literature clearly demonstrates that stimulants are highly effective in the treatment of ADHD in children, findings on their effectiveness in treating adult ADHD are less consistent. Response rates to stimulant treatment in adults have been highly variable, ranging from 25 per cent to 75 per cent, and on average poorer than those typically seen for children. These inconsistencies may be due to a variety of factors, including different rates in psychiatric comorbidity, insufficient dosing, and differences in methodology and use of diagnostic criteria.^{63,64}

Most of the research on the effectiveness of stimulant treatment for adult ADHD is for methylphenidate, and other stimulants not available in Australia, such as mixed amphetamines and pemoline. Few studies have examined the use of dexamphetamine for adult ADHD.

Faraone et al. (2004) recently published a review examining the efficacy of methylphenidate for treating adult ADHD.⁶⁵ From their meta-analysis of double-blind randomised studies they concluded that methylphenidate is effective at treating adult ADHD, particularly when higher doses are used.^a

In a randomised, double-blind, placebo-controlled trial, Paterson et al. (1999) examined the short-term efficacy of dexamphetamine in treating adult ADHD.⁶⁶ At the completion of the six-week trial, adults in the dexamphetamine group experienced significant improvement on a variety of measures compared with the placebo group. Taylor and Russo (2001) also reported significant improvement in ADHD symptoms for a short course of dextroamphetamine^b in 17 adults with ADHD.⁶⁷ These patients also reported that dextroamphetamine had a positive effect on their motivation.

Side effects experienced by adults with ADHD who take stimulants are mild, with common ones including insomnia, edginess, reduced appetite, weight loss, dysphoria, obsessiveness, tics, and headaches.⁶⁴ Cases of psychosis associated with prescribed dexamphetamine, although rare, have been reported.⁶⁸ Stimulants should not be used in patients who have the following conditions: psychosis, glaucoma, symptomatic cardiovascular disease, hyperthyroidism, and hypertension.⁶⁹

Although stimulants are drugs of potential abuse, they are unlikely to encourage abuse or dependence when taken orally and in modest doses, as typically prescribed in clinical settings.⁷⁰ Recent research indicates that stimulant treatment for children with ADHD may be protective against later substance abuse.^{71,72} Abuse by adults will occur in a small number of cases, particularly among individuals who have substance abuse problems.⁷³ Medical practitioners need to be vigilant for patient behaviour that may suggest abuse and carefully monitor their patients' use.^{74,75}

^a The authors defined high-dose studies as those having a mean dose of 0.9 mg/kg/day or greater. The mean daily doses were 70 mg (1.05mg/kg) for the high-dose group and 44 mg (0.63 mg/kg) for the low-dose group.

^b Dextroamphetamine is the name given to dexamphetamine in the United States.

Until recently, a major limitation of stimulant treatment has been the short-acting nature of the drugs themselves. Typically, patients have had to take two to three doses a day to gain day-long relief from their symptoms. Long-duration or extended release preparations are now available in Australia, providing patients with the potential for once-daily dosing. These preparations have different profiles of action that clinicians need to take into account when making a drug selection. Dosing, in particular, needs to be carefully managed to ensure that adults are not under-dosed.⁷⁶ The potential benefits of extended release stimulant medications for individuals with ADHD are not likely to be fully realised until there is greater clinical experience in their use.

Medication alternatives to stimulants are needed for certain patients, including those who do not respond adequately to stimulants, who develop adverse reactions to stimulants, who may develop possible tolerance, who may be at risk of stimulant abuse, or who have comorbid depression. The most common alternative medication treatment for ADHD is antidepressants.

2.4.2 Antidepressants

The published literature on the effectiveness of antidepressants includes some medications that are not available in Australia. Some of the more commonly researched antidepressants are venlafaxine, desipramine, and bupropion. At least half of the adult subjects with ADHD who have participated in the research have responded positively to antidepressant medication.^{12,77}

Kuperman et al. (2001) directly compared slow release bupropion (an atypical dopaminergic and noradrenergic antidepressant) with methylphenidate and a placebo in a study of 30 adults with ADHD.⁷⁸ The response rate was higher for bupropion (64 per cent) than it was for methylphenidate (50 per cent) but these rates were not significantly higher than the response rate for the placebo (27 per cent).^c The authors noted that this result may have been due to the relatively high placebo response rate.^d

2.4.3 Other medications

Atomoxetine is a selective norepinephrine reuptake inhibitor. It has just recently been approved by the Therapeutic Goods Administration (TGA) in Australia for the treatment of ADHD in persons aged six years or older. It is the only non-stimulant drug specifically indicated for the treatment of ADHD in Australia.

Research with samples of adults and children indicates that atomoxetine could be a useful alternative to stimulant treatment.⁸⁰⁻⁸³ Whether it will become a main line of treatment for ADHD will be determined after further research is conducted and clinical experience is gained.⁸⁴

Very few other medications are used to treat ADHD. They include the antihypertensive agents clonidine and guanfacine, amino acids, cholinergic agents, nicotine, and antinarcotics. Minimal published findings are available on their effectiveness in treating adult ADHD.¹²

^c Response rates were based on improvement ratings obtained using the Clinical Global Impression Scale.⁷⁹

^d The authors state that the response rate for placebo in other published studies is around 10 per cent.

2.4.4 Psychosocial interventions

Although it is universally recommended that treatment for ADHD include psychosocial or behavioural components, there is limited scientific evidence to support their effectiveness, particularly in adult populations.

Psychological treatments are considered useful for modifying inappropriate beliefs held about ADHD, to teach specific skills (for example: vocational, organisational, time management, and financial skills), to improve daily functioning, and to address comorbid conditions that may have arisen.² Even among adults whose symptoms have been stabilised by medication, these treatments may provide benefit. Some adults may require therapy to address negative feelings and perceptions about themselves and others. These might include a sense of anger, frustration and sadness about opportunities missed because of their disorder, resentment at others who did not appreciate that their behaviour was not controllable, and low self-regard brought on by years of criticism and perceived failure.¹¹

Stevenson et al. (2002) reported on the efficacy of a cognitive remediation programme (CRP) for adults with ADHD using a randomised controlled trial.⁸⁵ The CRP involved eight weekly group sessions (designed to teach strategies to improve motivation, concentration, listening, impulsivity, organisation, anger management, and self-esteem), the use of support people who acted as coaches, and the use of participant workbooks and homework exercises. Twenty-two adults with ADHD who participated in the CRP were compared with a waiting list control group. About half of the participants in the treatment and control groups were on medication (mainly stimulants) for their ADHD. At the end of the trial, participants in the CRP reported significant improvement in their ADHD symptoms, their organisational abilities, and their self-esteem and anger management. These improvements were maintained one year after treatment and were comparable to responses reported for studies examining the efficacy of stimulant medication in the treatment of ADHD in adults. Participants in the study who were not on medication responded to the treatment as well as those who were on medication.

2.4.5 Alternative treatments

Alternative treatments can be defined as any treatment other than prescription psychoactive drugs or standard behavioural treatments. Arnold (2001) reviewed evidence on alternative treatments for ADHD and examined their applicability to adults.⁸⁶ According to his analysis, most treatment alternatives for ADHD have not undergone enough research to support their clinical recommendation. Further, a few alternatives are probably ineffective for most patients, and some are possibly dangerous. He concluded, however, that there are a group of alternatives that have evidence or features suggesting they should be implemented, providing it is appropriate and practical to do so. Included in this group are relaxation training combined with electromyographic (EMG) biofeedback, meditation, and massage. Before deciding to undergo an alternative treatment, an individual should ensure they are adequately informed about the science behind the intervention and consult their medical practitioner.⁸⁷

2.5 Restrictions on prescribing in NSW

The prescribing of the stimulants dexamphetamine and methylphenidate in NSW is subject to the *Poisons and Therapeutic Goods Act 1966* and its regulations.

To prescribe stimulants for the treatment of ADHD in adults in NSW, a medical practitioner requires authorisation from the NSW Department of Health.⁸⁸ The assessment of ADHD in adults and initial prescribing of stimulant medication is limited to psychiatrists. In some circumstances, neurologists and general practitioners may be approved to prescribe stimulants for adults, but only after initial assessment, diagnosis and treatment by a psychiatrist. A paediatrician who has diagnosed and treated a patient for ADHD prior to the patient reaching 18 years may continue prescribing for the patient until the age of 25 years.

For a diagnosis of ADHD, DSM-IV criteria must be fulfilled. In addition, the patient must have a childhood history of hyperactivity and/or inattention problems with at least one of the following symptoms: behaviour and/or attention problems at school, impulsivity, over excitability, and temper outbursts. In adulthood, there must be the continuing presence of hyperactivity and/or inattentiveness together with at least two of the following characteristics: affective lability, disorganisation and inability to complete tasks, hot temper, impulsivity, easily distracted, and major problems with short-term memory. Further, there must be evidence that the condition is long standing and clinically severe in terms of dysfunction. The symptoms must be continuous and not related to stress or crises. While comorbidity may exist, ADHD should be the most prominent disorder.

Until recently, all medical practitioners who wished to prescribe stimulants for the treatment of ADHD in adults were required to apply for authority on an individual patient basis, prior to commencing treatment. In September 2003, the NSW Department of Health introduced a new approval system allowing authorised medical practitioners to prescribe stimulants to certain patients without the need for prior individual patient authority by the Department. Under this new system, psychiatrists and neurologists may apply to the Department for a general authority, granting them approval to prescribe stimulants to most patients without prior individual patient authority. Certain types of patients are excluded and require individual approval prior to commencing treatment.

The new approval system requires that medical practitioners notify the Department of prescriptions they have written for patients where prior individual patient authority is not required. A similar notification system has been in place since 1996 for the prescribing of stimulant medication for the treatment of ADHD in children.⁸⁹

When a medical practitioner applies to the Department to treat an individual patient, the application must be accompanied by a clinical report and management plan, including details about the patient's history, assessment and diagnosis, the severity of their disorder and the presence of comorbidity. For certain types of patients (such as the elderly, and those with significant comorbid conditions, or a history of substance abuse or dependency) or where a high dose is proposed, a second opinion from another psychiatrist must be submitted in support of the application. When the Department grants approval to prescribe, an authority is issued. Authorities are issued for various lengths of time, but usually for 12 months. They are not issued for longer than three years.

2.6 Aim of this study

The aim of this study is to describe NSW trends in the prescribing of stimulant medication for the treatment of ADHD in adults. There are five corresponding sections in Methods (Part 3) and Results (Part 4).

- Section 1 presents trends in the number of adults with ADHD who were treated with stimulant medication for the first time, for the period 1990 to 2002.
- Section 2 examines the characteristics of adults with ADHD who commenced stimulant treatment for the first time, for the period November 2002 to December 2002.
- Section 3 shows trends in the rate (per 10,000 population) of adults with ADHD who were treated with stimulant medication, for the period 1993 to 2003.
- Section 4 presents characteristics of adults who were treated with stimulant medication as at 30 June 2003.
- Section 5 examines attrition from stimulant treatment using a cohort of adults with ADHD who commenced stimulant medication in 1998.