Prevalence and detection of Attention Deficit Hyperactivity Disorder (ADHD) in Salford adults.

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Introduction

What is ADHD?
Attention Deficit Hyperactivity disorder (ADHD) is a well-known neurobehavioral, developmental disorder of childhood and adolescence. It is characterized by attention deficits, including distractibility, frequent forgetfulness, hyperactivity (motor restlessness, inability to relax), impulsivity, affective lability, disorganization and inability to complete tasks. Over the last fifteen years it has been increasingly recognised that cases of ADHD persist in adulthood. As a development disorder it is suggested it cannot newly develop in adults without previously being present in childhood.

ADHD in adulthood
In adults the symptoms include carelessness and lack of attention to detail, poor organisational skills, inability to focus or prioritise, continually losing or misplacing things, forgetfulness, restlessness and edginess, difficulty keeping quiet and speaking out of turn, blurting out responses and often interrupting others.
Associated features of adult ADHD are marital instability, higher rates of divorce, job loss, unemployment, poor work performance, more frequent job changes and academic or vocational success below that expected on the basis of education. It is associated with impaired social relationships, alcohol and drug abuse and increased risk of car accidents. (Faraone et al, 2010). There is a high comorbidity with other psychiatric conditions.

ADHD often represents an impairing lifelong condition in adults yet it is currently under diagnosed and under treated (Upadhyaya et al, 2013). There has been an increased awareness and evidence that many ADHD children do not “outgrow” ADHD once they reach adulthood and their health needs are still wanting (Barkley., 1995; Greenfield et al, 1988; Mannuzza et al, 1993, 1998).

One UK survey also found that majority of consultant community pediatricians would require referral of ADHD cases in transition to adult services and only 22% were aware of a dedicated clinics for adults in their area. Many pediatricians had tried to address the issue locally and often yielded little success (Marcer et al, 2008).

Given the impact of ADHD in adult life, it is important that adults with ADHD are able to access appropriate services and support. Salford currently refers adult ADHD patients to a specialist psychiatrist and has observed an increase in referrals over recent months. Information regarding local needs is required to inform future service provision.

Aim

To provide information on the prevalence of adult ADHD in Salford to inform future service developments to meet needs.

Objectives

- Show time trend and projection of adult patients with ADHD in Salford.
- Cross reference with atomoxetine, methylphenidate and dexamfetamine prescriptions.
- Review research literature around the needs and prevalence of adult ADHD.
- Scope what further information should be collected to determine the needs of this group in Salford.
Method

Information was gained from a local GP database called Farsite (by North West E-health) and from research literature. Farsite was searched using the Read code for ADHD and the drug names methylphenidate, atomoxetine and dexamfetamine. The time frame was from 2010 to 2014. Using both pooled years and separate years supported the removal of duplicates. Gender, ethnicity and age band was included in the search.

An advanced search of literature was completed using electronic healthcare databases by Donald Onzima (University of Salford, Public Health Masters Student). The University of Salford SOLAR database was used for this, which is an online academic library. The search criteria/terms included: All studies that looked at ADHD in its various short forms and acronyms of ADHD; ADD; hyperkinetic disorder. The transition of children with ADHD and their transition to adulthood was also included. Literature searches were restricted to between 2005-14.
Results

1. **Country specific comparative prevalence and gender distribution from literature**

Diagram one below provides a summary of prevalence’s from different countries which vary between 1% to 7%. Difficulties exist however in comparing prevalence’s between studies due to variation in measurement methods and diagnosis criteria used (NICE, 2008).


![Diagram showing prevalence of adult ADHD in various countries](http://www.adhd-institute.com/burden-of-adhd/epidemiology/)

It is suggested however that some ADHD research from other countries may be generalized with regards to demographics, as concluded in an international Randomised Controlled Trial of Atomoxetine whereby ADHD participants were found to have similar demographics and baseline characteristics (Upadhaya, 2013).

There is consistency across studies that ADHD is greater in males than females although gender imbalance is suggested to reduce into adulthood. This maybe in part due to females presenting more with inattentive symptoms. Diagram two below summarises gender split for children.
2. **UK Prevalence and gender distribution from literature**

Prevalence estimates for ADHD in children and young people are around 3 – 9% and for hyperkinetic disorder 1 to 2% (NICE, 2008). Most studies report a higher prevalence in boys for example one UK survey of children aged 5 – 15 years found 3.6% of boys and 0.85% of girls had ADHD (NICE, 2008).

It has been estimated that the prevalence in adults in the UK ranges from 2.5 - 4%, with approximately 2.5% of adults meeting full diagnostic criteria for ADHD (Czobor et al, 2009; McCarthy et al, 2012; Simon et al, 2009; NICE; 2008).

Treatment prevalence has been reported in two UK cohort studies as increasing over time. The first of these found a six fold increase in prescriptions for ADHD for ages 15 – 21 between 1999 and 2006 (McCarthy, 2009). The second study found treatment prevalence estimates doubled between 2003 and 2008 for children up to 18 while for adults there was a four to five fold increase in treatment prevalence (McCarthy et al, 2012).

3. **Persistence into adulthood and prevalence of ADHD meeting full diagnostic criteria**

Over half of children find ADHD lessens into adulthood and half of adults who had a childhood diagnosis of ADHD have been found to still experience functional impairment (Coghill et al, 2008). In a ten year follow-up controlled study 78% of subjects met at least one definition of persistence into adulthood (Bierderman, 2010). Other studies have reported persistence rates of between 50 – 66% (see: http://www.adhd-institute.com/burden-of-adhd/epidemiology/).

A review of longitudinal follow-up studies of individuals diagnosed with ADHD as children found that by age 25 only 15% retained the full ADHD diagnosis. However a much larger proportion (65%) fulfilled criteria for either ADHD in partial remission /residual ADHD, indicating the persistence of some symptoms associated with clinical impairments in the
majority of cases (Farone et al, 2006). Residual or partial relates to diagnostic criteria met and number of symptoms / functional impairment.

The latter rates of progression into adulthood suggest that 20% who experienced ADHD in childhood will no longer have ADHD symptoms in adulthood.

The split of full ADHD to partial of the adult population (based on Farone et al’s 15% and 65%) is 19% with full clinical symptoms to 81% with residual symptoms. Applying this to the prevalence estimate of 2.5 – 4% it will be expected that 0.47 – 0.76% of adults have full ADHD by age 25, while 2 – 3.4% have residual ADHD. These ranges are similar to those found in the Psychiatric Morbidity Survey, 2007 of 0.6% (6 of 6 criterion met) and 2.3% (5 of 6 criterion met). See section 4.

4. Characteristics and demographics of adults with ADHD

The Adult Psychiatric Morbidity Survey includes questions about ADHD. It uses a Self-Report Scale (ASRS), developed in collaboration with the World Health Organisation (WHO), to estimate prevalence and determine characteristics of people with ADHD.

Findings include:

- Screening positive for ADHD did not vary significantly between men and women.
- The prevalence of screening positive for the disorder decreased with age.
- The proportion of men and women scoring four or more on the ASRS screen was highest among those aged 16-24 (13.8%) and lowest among those aged 75 and over (4.2%).
- Prevalence of ADHD characteristics varied by marital status. Single men and women were most likely to screen positive (11.4% and 13.3% respectively). This observed variation is likely to be due in part to the younger age profile of single adults.
- The proportion of men and women scoring four or more on the ASRS scale generally increased as household income decreased. Being in the lowest household income quintile was strongly associated with a positive screen for ADHD (17.3% of men and 11.6% of women).
- Employment status was associated with the presence of ADHD characteristics.
- Economically inactive men and women were most likely to screen positive for the disorder (21.9% and 12.9% respectively).
- The proportion of men and women scoring four or more on the ASRS screen varied by highest educational qualifications. Adults with no qualifications were more likely to screen positive for ADHD characteristics than those with a degree or equivalent qualification.
- 80% of adults who screened positive for ADHD were not in receipt of medication, counselling or therapy for a mental health or emotional problem.
- Among adults screening positive for ADHD, antidepressant medication was the most common type of medication taken in the past year.
- Two of the most commonly prescribed types of ADHD medication, Ritalin (methylphenidate) and Straterra (atomoxetine), were asked about. No women screening positive and 0.2% of men screening positive for the disorder were currently taking either of these.
5. **Salford prevalence estimate**

Applying the estimated prevalence of 2.5% - 4% to the Salford 18 – 64 population (154,296, source 2013 mid year ONS population estimate) it would be expected that Salford would have approximately:

3857 to 6171 adults aged 18 - 64 with ADHD

Of which between 725 and 1172 with full ADHD.

6. **Salford numbers from Farsite**

6.1 **Trend over time and forecast**

Searching Farsite by Read codes for ADHD and Hyperkinetic disorder identified small numbers with ADHD, particularly when considering the literature prevalence estimates. 171 patients have a diagnosis of ADHD or hyperkinetic disorder (with no time period selection). Of these 99 (58%) were aged 18 or under (86 males and 13 females).

It should be borne in mind that Farsite data is from GP recording and figures may illustrate recording practices and changes in coding. With ADHD there may be reduced recording as patient management is within secondary care/specialist care. Review of drug data however provided higher numbers and therefore analysis is presented of treatment prevalence, given ADHD is the licensed indication for these drugs. Third line choices of drugs, such as anti-depressants, were not included given their primary/wider indications.

Graph one below shows an increasing trend of prescriptions of methylphenidate, atomoxetine and dexamfetamine for all ages. Prescriptions to males have increased by almost 60% over the time period from 262 in 2010 to 409 in 2014. In females the prescriptions have more than tripled, although the total amount is still lower than males. Female prescriptions increased from 30 in 2010 to 100 in 2014. Other national reports have similarly described an upward trend in the number of prescriptions provided for ADHD medications in recent years with a 7.1% increase in Scotland the period of one year 2010/11 to 2011/12 for both under and over 18’s (Royal College of Psychiatrists, 2013).

Graph two shows the same ADHD medication split by under and over 18’s. The total number of adults aged 18 and over receiving medication for ADHD in 2014 was 132. This is much lower than the prevalence estimate for Salford of full ADHD which was in the region of 725 to 1172. A similar gap of treatment prevalence to estimated prevalence was found by McCarthy et al in her 2012 analysis of UK treatment prevalence.

There is a fourfold increase in adults receiving treatment from 2010 to 2014 which is also similar to increases reported nationally (McCarthy, 2012).

Prescribing numbers show a three fold difference by 2014 between those aged over 18 and those aged under 18.

Forecasting into the future estimates an increase in the over 18s of almost 100% by 2020 and an increase of under 18’s of 37% based on historical prescribing levels. The forecast is limited as it is based on five years of data and assumes that prescribing practices and Farsite recording continue following the same pattern as in previous years. The levels of prescribing rise sharply from 2012 to 2014, which could be due to improvements in coding and changes to coding practices, therefore the levels may plateau in future years. However, given the gap to prevalence estimates this increase would make the levels in line with the literature but could still be an underestimation of actual ADHD.
**Graph one: ADHD medication recorded on Farsite 2010 to 2014 with forecast to 2025**

![Graph showing ADHD medication recorded on Farsite 2010 to 2014 with forecast to 2025]

**Graph two: ADHD medication split by age 18 and under and over 18 as recorded on Farsite 2010 to 2014 with forecast to 2025**

![Graph showing ADHD medication split by age 18 and under and over 18 as recorded on Farsite 2010 to 2014 with forecast to 2025]
6.2 Gender split
Graph three shows the gender split. For both children and adults the ratio is higher for boys but this has lessened over time. For adults the proportion of males in 2014 was 75% of the total prescribed medicines (99 males and 33 females, a 3:1 ratio) which is a decline from 90% of the total in 2010 (29 males and 3 females, a 10:1 ratio). For children, in 2010, it was 90% of the total prescribed medicines (9:1 ratio) to males and 82% in 2014 (4:1 ratio). This may suggest that females are recognizing symptoms and seeking help in adulthood. There is some evidence that this may relate to parents experiencing their children being diagnosed with ADHD and recognizing symptoms in themselves (NICE, 2008).

For females under 18 the prescriptions increase by 2.5 times over the four years and for female adults the increase is 11 times the levels in 2010. For males under 18 prescribing levels have increased by a third compared to an increase of almost 3.5 times for adults.

Graph three: ADHD medication split by gender

6.3 GP Practice split
Graph four presents the rate (all ages) split by GP practice adjusting for the practice population size. Confidence intervals present whether the practice is above or below the Salford average.

There is variability of ADHD treatment prevalence across practices. Total numbers vary from 55 patients in the 5 year reporting period to less than five in each practice. The rate per 10,000 practice population varies from 11.53 to 2.04 with an average rate for Salford across the same time period of 5.37 per 10,000.

This is represented on diagram five which shows a relatively even distribution with the higher numbers predominately in East Salford which has a higher proportion of children.
Graph four: ADHD medication per registered GP practice population 2010 to 2014.

Diagram five: Map of ADHD medication per registered GP practice population 2010 to 2014.
Summary

The trend of increasing treatment prevalence suggests an increasing number of adults who maybe diagnosed with ADHD and may require specialist care in the future.

- There is a gap to estimated adult prevalence of 593 or 82%. This may indicate unmet need within Salford.
- It is estimated that the four fold increase seen in adults between 2010 and 2014 will continue to increase and adult treatment numbers in 2014 could double by 2020.
- There will be a concurrent 36% increase of children being treated therefore over half of the adults maybe diagnosed in adulthood.
- The gender split is 3:1 for adults and projections suggest this is likely to continue to be predominately males in future years.
- There does not appear to be a link locally with deprivation and those in treatment. Due to the gap in prevalence this cannot currently be analysed further.

Recommendations

1. If left untreated the presence of ADHD can result in social, educational and occupational disadvantage. It is therefore important that the potential unmet need identified in this analysis is considered with regards to systems for identification and diagnosis. Given adults with ADHD are likely to have a co-morbid psychiatric disorder there are opportunities to identify people with ADHD in existing services. Relevant education and awareness raising of care pathways is recommended.

2. Treatment gaps should also be considered further and audit of NICE clinical guidelines and Royal College of Psychiatry guidelines should be considered particularly around transition between services. Audit tools are available on the NICE website.

3. There is evidence that perceptions of stigma is associated with reduced uptake of services (NICE, 2013). Interventions to reduce stigma for ADHD and wider mental health problems are required.

4. Based on historical prescribing levels services should be planned for an increase in adults with ADHD in the region of 150 by 2020. If based on the gap between actual and prevalence estimates the increase could be in the region of 600.

5. Further insight or research should be gathered from both adults who were diagnosed in adulthood and adults who transitioned from children’s services into adult services. Information should be gathered on characteristics, access, outcomes and experiences of services.

6. The next Psychiatric Morbidity Survey results will be published in 2015/16. National changes in adult ADHD prevalence should be reviewed.
REFERENCES


