Research Article

Evaluating the use of selective serotonin reuptake inhibitors (SSRIs) in patients with neurodevelopmental disorders, autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD)

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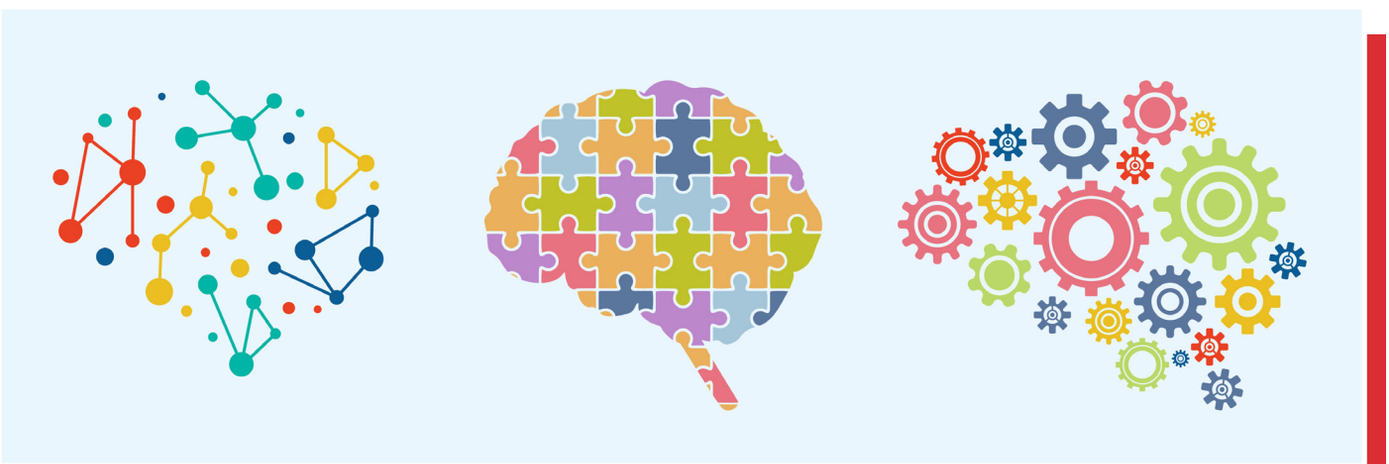

Abstract

Background Autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are neurodevelopmental conditions that cause a significant risk of comorbid disorders such as anxiety and depression. Therefore, many individuals with neurodevelopmental disorders are prescribed mood regulating medication such as selective serotonin reuptake inhibitors (SSRIs).

Aim The primary aim of this service evaluation is to find out the proportion of Child and Adolescent Mental Health Service (CAMHS) patients with ASD or ADHD that are prescribed SSRIs.

Method A total of 60 individuals with ASD or ADHD between the ages of 11 and 18 were found to be under the care of CAMHS at St. David's Hospital, Cardiff. Digital notes of these patients, stored on the healthcare software 'Paris', were then reviewed.

Results 33 patients were prescribed SSRIs. 20 (60.6%) of those had ASD alone, 5 (15.2%) had ADHD alone and 8 (24.2%) had both ASD and ADHD. Sixty-five per cent of the study population had at least one comorbidity, with anxiety disorders being the most common (n=21, 35.0%).

Conclusion These findings are consistent with previous research, suggesting that a significant proportion of individuals with ASD and/or ADHD also have comorbid psychiatric conditions, and many of them require treatment with SSRIs.

Abbreviations

ADHD – Attention deficit hyperactivity disorder
ASD – Autism spectrum disorder
CAMHS – Child and Adolescent Mental Health Services
SSRIs – Selective serotonin reuptake inhibitors

Introduction

Autism spectrum disorder (ASD) is a common neurodevelopmental disorder characterised by difficulties in social interaction, communication, and repetitive or restrictive behaviours. The Diagnostic and Statistical Manual of Mental Disorders (DSM-5) outlines the core symptoms of ASD, which include deficits in developing relationships, social-emotional reciprocity, and nonverbal behaviours used for social interaction.[1]

Individuals with ASD are also at a higher risk of having conditions such as attention deficit hyperactivity disorder (ADHD), a neurodevelopmental condition which is characterised by symptoms of inattention, hyperactivity and impulsivity.[2] The spectrum of ASD and ADHD disorders show considerable overlap in presentation.[3]

Increasing evidence suggests that depression and anxiety are very prevalent comorbidities in both ASD and ADHD.[2,4] These conditions can have a significant impact on an individual's daily life, leading to difficulties in relationships and functioning. As a result, many patients

with ASD or ADHD are prescribed antidepressant medication, specifically selective serotonin reuptake inhibitors (SSRIs). SSRIs can regulate mood and reduce symptoms of depression and anxiety.

This service evaluation therefore aims to analyse ASD and ADHD patients in the Child and Adolescent Mental Health Service (CAMHS) at St David's Hospital. CAMHS is an NHS run service that assesses and treats young people with significant mental health problems. They are involved in the care of some of the more complex cases from the separate neurodevelopmental and community services.

Despite the significance of comorbid psychiatric conditions being well cited in the literature, there is currently little research into the use of SSRIs in this specific population with neurodevelopmental conditions in CAMHS. Thus, the evaluation aims to find how significant SSRI use is in CAMHS patients with ASD or ADHD, to be able to address the needs and treatment options of these children with complex comorbidities.

The evaluation aims to achieve the following objectives: 1. Find out the proportion of CAMHS patients with ASD or ADHD that are prescribed SSRIs. 2. Compare SSRI use in ASD and ADHD in male and female patients. 3. Compare SSRI use in ASD and ADHD and additional diagnoses.

Methods

The research method used was a retrospective data analysis, where data was collected from patients' medical records after they had been involved in treatment. All patients who had received treatment for ASD or ADHD at St David's Hospital CAMHS and were under the age of 18 years on 31 March 2023, were included. Those awaiting a formal assessment for neurodevelopmental conditions were excluded for the purpose of this evaluation, as their diagnosis was not yet confirmed.

To collect data for this study, all doctors in the service were asked to provide a list of their current patients with ASD and ADHD, including names and PARIS ID numbers for each patient. PARIS is the electronic care record system used to store information about patients. It allows healthcare professionals to access patients' up to date, relevant medical history, securely.

The PARIS system allowed clinical information, including sex and age of the patient to be recorded, both of which are important demographic factors. All correspondence and case notes from healthcare professionals were then reviewed to determine the diagnosis of ASD and ADHD in each individual. Additional diagnoses, such as anxiety and depression, were only noted if the correspondence explicitly described a diagnosis. If the information gathering on the PARIS system did not verify any of these details, the case note holder, usually the patient's doctor, was consulted to find out. This approach ensured that the results were based on confirmed diagnoses. The latest prescribed medication, dose and frequency were also recorded to determine which patients were prescribed SSRIs.

This data was organised using a password protected Microsoft Excel spreadsheet, with all patient identifiable information removed to maintain confidentiality. Analysis of the results was also performed on Excel.

As all information used in the study was collected from previous routine clinical care, as a service evaluation, ethical approval was not required. Patient confidentiality and privacy were ensured throughout the study to protect patients' rights.

Results

Sixty patients were recruited for the service evaluation, with an age range from 11—18 years. Of these, 26 (43.3%) had a diagnosis of ASD alone, 20 (33.3%) had ADHD alone, and 14 (23.3%) had both ASD and ADHD. Thus, the total number of individuals with ASD was 40 (66.7%), and with ADHD, 34 (56.7%).

The number of males and females were roughly equal, with 31 male (51.7%) and 29 (48.3%) female. Of the 31 male patients, 9 (29.0%) were diagnosed with ASD, 15 (48.4%) with ADHD, and 7 (22.6%) with both. Of the 29 female patients, 17 (58.6%) were diagnosed with ASD, 5 (17.2%) with ADHD, and 7 (24.1%) with both.

When considering the use of SSRIs in this demographic, overall, 33 patients were found to be on SSRIs, 55.0% of all patients with a neurodevelopmental condition. The prescription of SSRIs varied with the specific diagnosis; 20 (60.6%) were on SSRIs with ASD alone, 5 (15.2%) with ADHD alone and 8 (24.2%) with both ASD and ADHD. **Figures 1-3** demonstrate these proportions, and the variation with males and females.

The study also analysed the prevalence of additional diagnoses and found a result of 39 out of 60 patients with at least one comorbidity. Of particular importance, anxiety disorders were the most common (n=21, 35.0%). Furthermore, 9 (15.0%) patients had a diagnosis of depression/depressive episode, 2 (3.3%) had OCD, and 4 (6.7%) had Tourette's. **Figure 4** summarises the proportion of SSRI use with diagnosis of anxiety and mood disorders.

Of the 33 patients on SSRIs, sertraline was prescribed most often (n=18), followed by fluoxetine (n=14) and citalopram (n=1). An additional finding was the frequent use of Circadin, which contains the active substance melatonin. 18 (30.0%) patients were prescribed Circadin at differing doses to help with sleep.

Discussion

The data provided shows the demographic breakdown of individuals with the neurodevelopmental disorders ASD and ADHD, in addition to any comorbid psychiatric conditions and their medication history. The findings show that a diagnosis of ASD alone was most prevalent in the sample population, 10% higher than the prevalence of ADHD. This is in contrast to the general UK population, where there is a higher prevalence of ADHD than ASD.[5,6] However, the existence of an ADHD clinic for less complex cases, separate to general CAMHS, could account for the lower number of children with ADHD found. It is also noteworthy that a substantial number of individuals were diagnosed with both ASD and ADHD, as this dual diagnosis is relatively common in clinical practice.[7]

Out of the 60 patients in total, the evaluation considered a nearly equal ratio of boys and girls. The results indicate that more males than females were diagnosed with ADHD, while more females were diagnosed with ASD. It is interesting to observe the high proportion of autistic girls in CAMHS because much of the literature shows that both conditions normally predominate in males, with a male to female ratio of approximately 3:1.[5,6,8] There is much debate regarding the true prevalence as there are many differences in samples and because there tends to be a gender bias, where girls have a disproportionate risk of not being diagnosed.

The higher rate of girls with ASD found in this research could therefore be due to the nature of CAMHS itself. Due to CAMHS' involvement in highly complex cases, the healthcare team are likely to be particularly experienced in noticing and diagnosing neurodevelopmental conditions, even in girls. Compared to symptomatic children in the community or seeing GPs or paediatricians, the CAMHS team have longer to spend with a child and are well versed in symptoms to look out for in girls. Thus, the underreporting of autistic traits in the community[9] are caught by the service. It is widely found that females are diagnosed with ASD much later than males.[10] As CAMHS caters towards older children, it is likely that missed diagnoses in girls are caught up when they enter the service.

In terms of comorbid psychiatric conditions, the prevalence varies

widely, due to the wide spectrum of neurodevelopmental conditions. However, it is estimated that around 40% of children with ASD have at least one comorbid anxiety disorder,[11] and around 30% for depressive disorders.[12] In addition, around 15-35% of children with ADHD have a comorbid anxiety disorder, and 12-50%, a depressive disorder.[13] Therefore, the values in CAMHS match the trend in broader data, where there are much higher rates of comorbid psychiatric conditions, and where anxiety is the most common. The significant proportion of patients with additional diagnoses and on SSRIs in the study population could again, be due to the specialised features of CAMHS, where compared to community services, a disproportionate number of children with complex comorbid emotional disorders are seen.[14] **Figure 4** demonstrates the strong link between anxiety and depression, and the use of SSRIs – CAMHS patients with a psychiatric condition were more likely to be on SSRIs than the average CAMHS patient with a neurodevelopmental condition.

As in the literature, the disparities between the sexes extend to the prescription of SSRIs too. **Figure 3** shows that females in CAMHS are generally prescribed SSRIs more often than males, whichever neurodevelopmental conditions they have. This could be due to the higher rate of anxiety and depression in women in the wider population.[15,16]

In the service studied, it is significant to find that sertraline was the most prescribed SSRI despite NICE guidelines recommending fluoxetine as the optimal treatment for young people.[17] Although, this could be due to the fact sertraline is commonly prescribed second line, after a trial of fluoxetine. This was seen in the clinical notes for some patients with severe psychological disorders.

Use of other medication such as melatonin is also significant as it regulates sleep, which is commonly disturbed in children with ASD and ADHD. Levels of melatonin are often low in children with these conditions. Thus, the incidental finding of 30.0% of patients on melatonin reinforces research that show its use in children with neurodevelopmental disorders.[18]

The main strength of this retrospective data analysis is the ability to analyse the whole CAMHS population with ASD and ADHD, quickly, and cost effectively. As the data was already collected for clinical purposes, more time could be spent examining the use of SSRIs in this population.

On the other hand, the main limitation of the study is the small sample size of 60 individuals that reduces generalisability to the general population. In addition, there was no analysis of other demographic factors such as economic background and ethnicity, which can significantly alter research outcomes. Finally, as there is much overlap between the multiple children's mental health services, there is likely to be overlap in the patient populations. This makes it difficult to identify true subsets of children with comorbidities.

Conclusion

In conclusion, the majority (n=39, 65.0%) of children with ASD and/or ADHD in CAMHS have at least one comorbid psychiatric condition, with anxiety, then depression, being the most common. 55.0% of all patients with a neurodevelopmental condition are on SSRIs to regulate symptoms of these comorbidities. Females in CAMHS were generally found to be prescribed SSRIs more often than males, despite which neurodevelopmental condition they had.

Unfortunately, because of the small sample size and limited population that could be enrolled into the study, it is difficult to determine a conclusion that could be applied to the general population. However, the results found are hugely beneficial for evaluating the specific mental health service. The data provided sheds light on the demographic characteristics and significant comorbidity burden on patients with neurodevelopmental disorders, specifically ASD and ADHD. The variance in SSRI use with different comorbidities, and different sex, highlights the importance of conducting further research into the efficacy of SSRIs within these demographics and further populations. Overall, the substantial number of children requiring SSRIs indicates the necessity for future research into the impact on patients, long-term effects of SSRIs, and other treatment options available.

Acknowledgements
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Contribution statement
The author was solely responsible for the collection, analysis, and interpretation of all the data involved. The author was involved in the drafting of the work and gave approval for the final version to be included in INSPIRE.

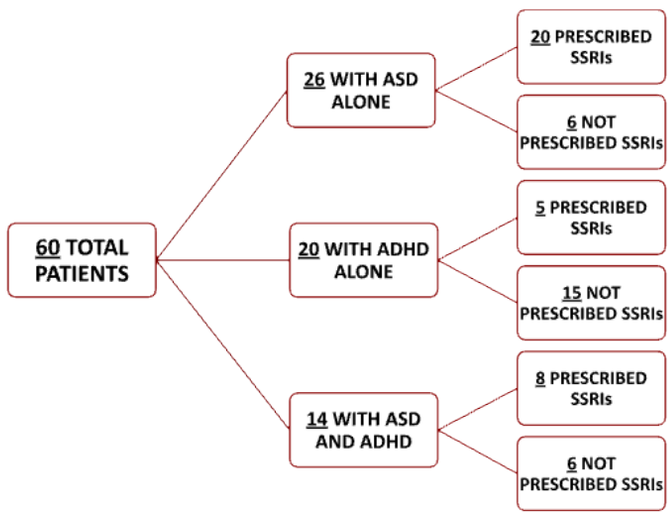

Figure 1. Flow chart noting the number of individuals with neurodevelopmental conditions prescribed SSRIs.

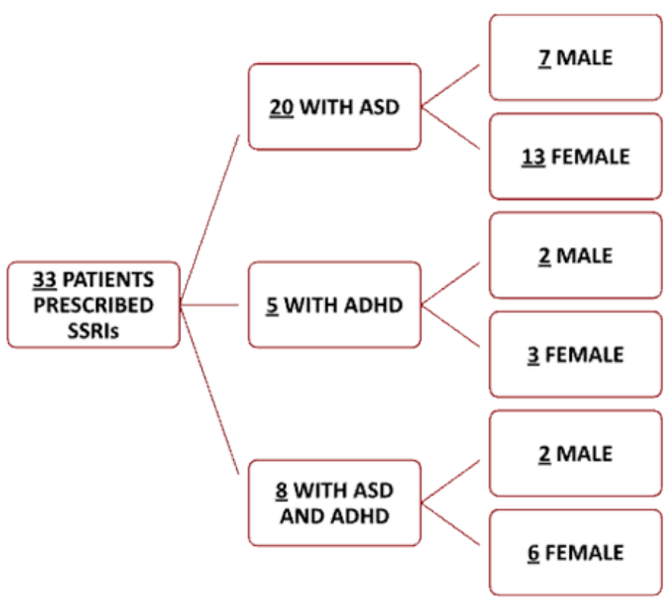

Figure 2. Flow chart noting the number of individuals with neurodevelopmental conditions according to gender.

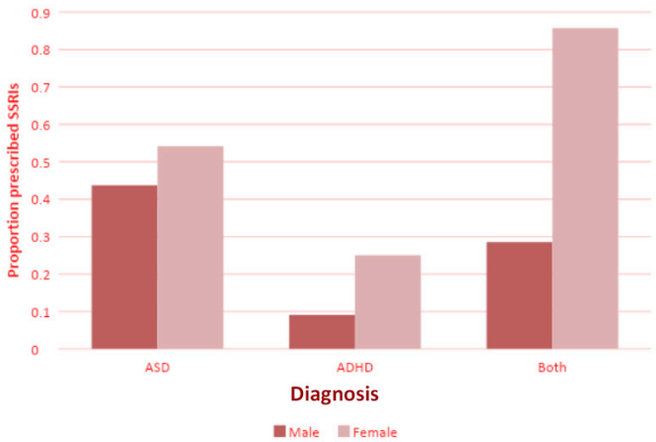

Figure 3. Chart showing the proportion of children with a neurodevelopmental condition that are prescribed SSRIs – ASD male SSRIs (n=7), ASD female SSRIs (n=13), ADHD male SSRIs (n=2), ADHD female SSRIs (n=3), Both male (n=2), Both female (n=6).

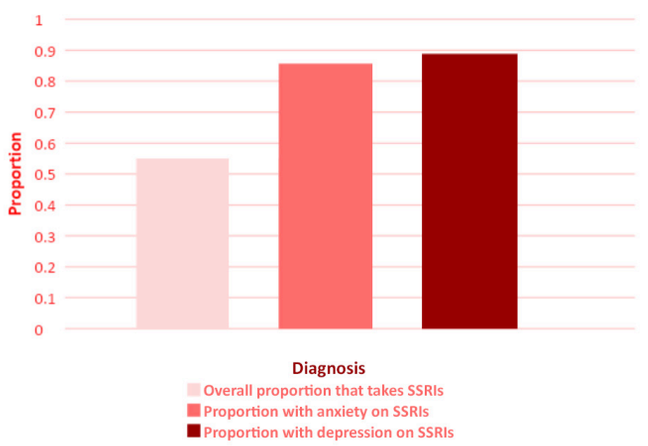

Figure 4. Chart showing the proportion of children taking SSRIs with comorbid anxiety and depression, compared to the average proportion taking SSRIs in the CAMHS study population.

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I am currently a fourth year medical student at Cardiff University. My interest in medicine and psychiatry stems from a love of communicating with patients to get to the root of their problems. This is what led me to select a project in CAMHS for my third year SSC. Children seen in CAMHS are some of the most vulnerable, but psychiatry is far behind general medicine in diagnosis and management. That is why I hope to contribute to mental health awareness and further research throughout my career.