



Attention Deficity Hyperactivity Disorder Under Pharmacological Treatment: Prevalence, Treatment Adherence and Comorbidity

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Abstract

Background: Few studies have analyzed use of or adherence to Attention Deficit Hyperactivity Disorder (ADHD) medication over the long term. The aims of this study were to determine the prevalence of ADHD under treatment in a general population, estimate treatment compliance, and analyze the presence of comorbidities based on the use of concomitant psychotropics.

Methods: Retrospective cohort study of ADHD drugs dispensed in a Spanish healthcare district between 2015 and 2017.

Results: Of the population studied, 0.3% were under pharmacological treatment for ADHD and of these 71.2% were male and 28.8% were female. The most common treatments were methylphenidate (79.7%) and lisdexamfetamine (11%). Five percent of patients were also taking antidepressants, 2.2% anxiolytics, 1.1% hypnotics, and 4.3% antipsychotics. Forty percent of patients had good adherence (defined as an adherence rate of ≥ 80). Mean \pm SD overall adherence was $63\% \pm 32.8$. The rates by age group were 64.8% in children <15 years, 55.1% in adolescents aged 15-19 years, and 65.4% in patients aged ≥ 20 years. Grouped by sex, adherence was 64.3% in females and 62.2% in males.

Conclusions: Three times as many male as female patients in our series were under pharmacological treatment for ADHD and a low proportion of the patients were taking concomitant psychotropic medication. Mean treatment compliance was two-thirds of the prescribed treatment duration. Male sex and adolescence were associated with the worst adherence rates.

Abbreviations: ADHD: Attention Deficit Hyperactivity Disorder; DDD: Defined Daily Dose; MARS: Medication Adherence Rating Scale; MPR: Medication Possession Ratio; ODD: Oppositional Defiant Disorder; SD: Standard Deviation

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) starts in childhood with symptoms of hyperactivity, impulsivity, and/or inattention. These symptoms affect cognitive, academic, behavioral, emotional, and social functioning [1]. The reported prevalence of ADHD in children ranges from 2% to 18% depending on the diagnostic criteria used and the population studied (e.g. primary care versus hospital) [1]. The estimated prevalence in school-aged children is 8% to 11%, making it one of the most common disorders of childhood [2]. According to a multicenter meta-analysis of 175 studies involving 1,023,071 individuals, the

estimated pooled prevalence of ADHD in adults aged over 36 years was 7.3% (95% CI, 6.7-7.8) [3]. Epidemiological studies of ADHD in the adult population have estimated a current prevalence of 3.4% nationwide and 4.4% in the United States [4,5]. Based on data from the 2015-2016 US National Survey of Children's Health (NSCH), approximately 10% of children aged between 4 and 17 years had a diagnosis of ADHD [6]. ADHD is more common in boys, with a male to female ratio of 4:1 for primarily hyperactive ADHD and 2:1 for primarily inattentive ADHD [7]. According to the 2011-2012 NSCH, 15.1% of boys and 6.7% of girls in the United States had ADHD [6].

Comorbidities

Children and adolescents with ADHD often have concomitant psychiatric disorders, such as oppositional defiant disorder (ODD), conduct disorder, depression, anxiety, and learning disabilities [8,9]. Anxiety disorder and ADHD coexist in approximately 20% to 40% of cases [7]. Anxiety may be secondary to childhood ADHD but in many cases, it appears to be a distinct disorder, independent of ADHD [10]. Depression coexists in one in three patients with ADHD [6] and appears to be more common in those with inattentive and combined ADHD [11]. Children with concomitant ADHD and depression may have relatives with a history of major depressive disorder [12], while adolescents with ADHD and mood disorder have been found to be at greater risk for suicide [13]. Adults with ADHD tend to have concomitant psychiatric disorders. One US study found that adults with ADHD had a higher risk of mood disorders (odds ratio [OR], 2.7–7.5; 95% CI, 3.0–8.2), anxiety disorders (OR, 1.5–5.5; 95% CI, 2.4–5.5); substance use disorders (OR, 3.0; 95% CI, 1.4–6.5); and intermittent explosive disorder (OR, 3.7; 95% CI, 2.2–6.2) [14]. Medication, with or without behavioral and/or psychological interventions, is the first-line treatment for school-aged children (≥ 6 years), adolescents, and adults who meet the diagnostic criteria for ADHD [2]. The most common drugs used are methylphenidate and lisdexamfetamine (stimulants), followed by atomoxetine and modafinil used off-label; $\alpha 2$ -adrenergic agonists are also used although they have been found to have limited efficacy in adults [15]. Few studies have analyzed use of or adherence to ADHD medication over the long term. The aim of this study was to determine the prevalence of ADHD under pharmacological treatment in a general population, estimate treatment compliance, and analyze the presence of comorbidities based on the use of concomitant psychotropics.

Materials and Methods

Data Sources

Retrospective study of prescription drug dispensation records to identify ADHD prescriptions in the healthcare district of Lleida, Spain between January 1, 2015 and December 31, 2017. Prescription data were obtained from the Catalan Health Department's database, which classifies drugs using the World Health Organization's Anatomical Therapeutic Chemical classification system [16]. Demographic information (date of birth and sex), administrative status (including death and change of residence), and medical diagnoses were obtained from primary care information systems.

Cohort Selection

All patients issued at least one ADHD prescription between January 2015 and December 2017 were eligible for inclusion. We excluded patients who had moved out of the region or died during the study period, patients for whom information on medication use was missing, patients with erroneous or duplicate entries, and patients from other healthcare districts who had at some stage been prescribed ADHD medication in Lleida. The following variables were recorded: age at start of study; prescription fills for

centrally acting sympathomimetics (ATC code N06BA), guanfacine (CO2AC02), antidepressants (N06A), anxiolytics (N05B), hypnotics and sedatives (N05C), and antipsychotics (N05A); and clinical diagnoses associated with the prescriptions. The total number of patients under pharmacological treatment for ADHD was 976 in 2015, 971 in 2016, and 1011 in 2017. Fifty-two patients were excluded in 2015, 57 in 2016, and 57 in 2017.

Treatment Duration and Adherence

Treatment duration was calculated by counting the number of months from the first prescription fill starting in January 2015 to the last fill in December 2017. Treatment episodes were complete when patients did not receive medication for a period of 6 months. Treatment durations were censored for patients who had not completed treatment by the end of the study period. Treatment adherence was estimated using the medication possession ratio (MPR). For each medication, we calculated the number of units needed per month according to the Defined Daily Dose (DDD) assigned to each drug by the World Health Organization's Collaborating Centre for Drugs Statistics Methodology [16]. The MDR (adherence ratio) is calculated by dividing the number of units dispensed by the prespecified number of units required for the duration of treatment. A ratio of $\geq 80\%$ was chosen to indicate good adherence. Good treatment compliance, in turn, was defined as an adherence rate of $\geq 80\%$ up to completion of treatment in patients who had been treated for over 4 months. Comorbidities were analyzed by studying concomitant use of antipsychotics, antidepressants, anxiolytics, and hypnotics and sedatives. The study was approved by the clinical research ethics committee of IDIAP Jordi Gol i Gurina (code P18/063) and was conducted in accordance with good clinical practices, with appropriate safeguarding of ethical and confidentiality issues. Statistical analysis: A descriptive analysis of the cohort was performed using frequencies and percentages. Compliance rates were estimated with a confidence interval of 95%. Associations between compliance rates and study variables were analyzed using the chi-square test. Crude and adjusted odds ratios for treatment compliance were calculated using regression models (enter method). Statistical significance was established at $p < .05$.

Results

In total, 2791 patients were prescribed ADHD medication over the three study years (2015–2017). This corresponds to an annual incidence of 0.3%. There were 924 patients under treatment in 2015, 914 in 2016, and 953 in 2017. The largest group was the under-25 group, where 1.6% of males < 15 years, 0.5% of females < 15 years, and 0.8% of males and females aged 15–24 years had been prescribed an ADHD medication. The breakdown by age and sex for the last year of the study (2017) is shown in Figure 1. The most common ADHD medication was methylphenidate (79.7%) followed by lisdexamfetamine (11%). The breakdown of drug prescriptions per year and for the overall study period is shown in Table 1. Five percent of patients under treatment for ADHD were

also taking antidepressants, 2.2% were taking anxiolytics, 1.1% hypnotics, and 4.3% antipsychotics. Of the 2791 patients under ADHD treatment between 2015 and 2017, 71.2% were male and 28.8% were female. Their mean \pm SD ages were 16.8 ± 11.4 and 24 ± 19 years, respectively. Mean overall adherence was $63\% \pm 32.8\%$ and 40% of patients were $\geq 80\%$ adherent (Table 2). Adherence rates did not vary significantly according to type of medication, although patients on guanfacine, which was launched in just 2017, had the highest rate, at 82% (Table 3). Adherence rates by age group were 39.8% for the <15 group, 31.1% for the 15-19 group, and 49.5% for the >20 group. These differences were significant. Concomitant

psychotropic medication was more common in patients aged >20 years. Age had no significant influence on adherence rates (Table 4). Male patients under pharmacological treatment for ADHD outnumbered female patients in all age groups. Good treatment compliance (adherence $\geq 80\%$) was significantly more common in females (43.7% vs. 38.6% for males). Antidepressants, anxiolytics, and hypnotics were prescribed more frequently to females, while antipsychotics were more common in men. The differences in both cases were significant. No significant differences were observed for adherence to concomitant medication among males and females (Table 5, Figure 2).

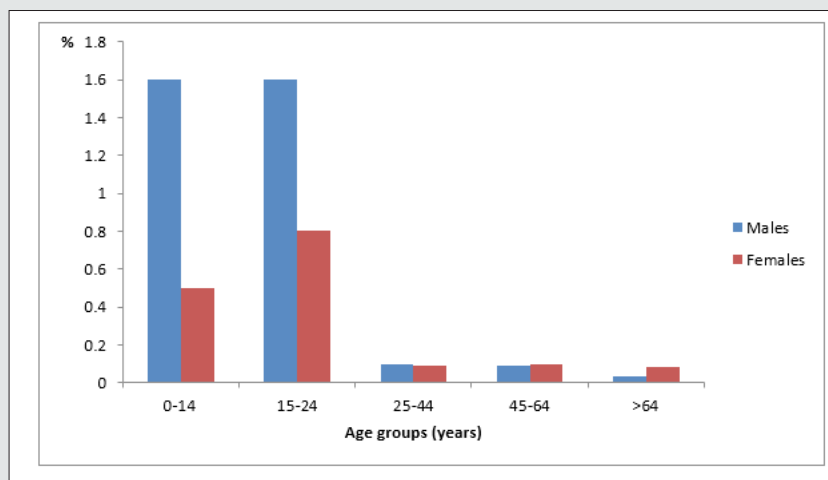


Figure 1: Use of ADHD medication in 2017 according to patient age and sex.

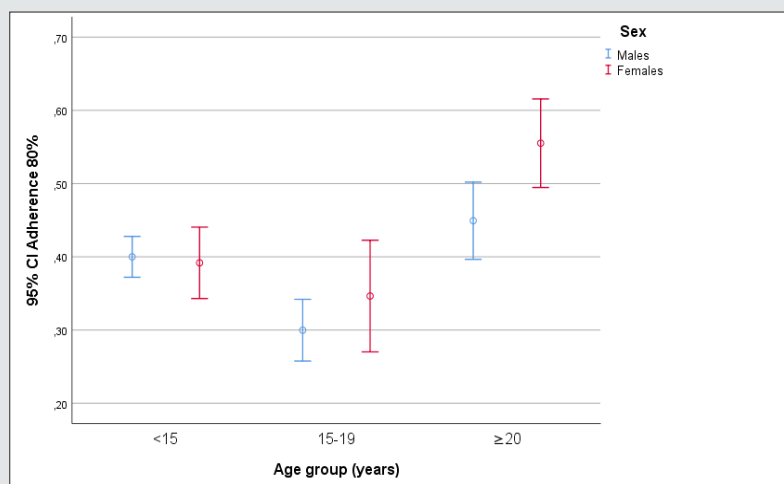


Figure 2: Adherence to ADHD drugs by age and sex.

Table 1: ADHD drugs prescribed overall and per year.

Drug	2015		2016		2017		2015-2017		p
	N	n (%)	N	n (%)	N	n (%)	N	n (%)	
Methylphenidate	933	767 (82.2%)	934	728 (77.9%)	968	764 (78.9%)	2835	2259 (79.7%)	0.001
Lisdexamfetamine		87 (9.3%)		120 (12.8%)		104 (10.7%)		311 (11%)	

Atomoxetine		60 (6.4%)		65 (7%)		45 (4.6%)		170 (6%)	
Modafinil		19 (2%)		21 (2.2%)		29 (3%)		69 (2.4%)	
Guanfacine		0 (0%)		0 (0%)		26 (2.7%)		26 (0.9%)	

Table 2: Drug adherence overall and per year.

	2015 (n=924)		2016 (n=914)		2017 (n=953)		Total (n=2791)		p
	N	n (%)	N	n (%)	N	n (%)	N	n (%)	
Age groups	924		914		953		2791		0,244
6-14 y		536 (58%)		516 (56.5%)		521 (54.7%)		1573 (56.4%)	
15-19 y		190 (20.6%)		202 (22.1%)		218 (22.9%)		610 (21.9%)	
≥ 20 y		198 (21.4%)		196 (21.4%)		214 (22.5%)		608 (21.8%)	
Sex (female)	924	270 (29.2%)	914	254 (27.8%)	953	280 (29.4%)	2791	804 (28.8%)	0.933
Adherence to ADHD drugs									
Adherence rate categories	924		914		953		2791		0.238
0%		63 (6.8%)		68 (7.4%)		68 (7.1%)		199 (7.1%)	
1-49%		249 (26.9%)		259 (28.3%)		279 (29.3%)		787 (28.2%)	
50-79%		228 (24.7%)		227 (24.8%)		233 (24.4%)		688 (24.7%)	
≥80%		384 (41.6%)		360 (39.4%)		373 (39.1%)		1117 (40%)	
50% adherence	924	612 (66.2%)	914	587 (64.2%)	953	606 (63.6%)	2791	1805 (64.7%)	0.232
80% adherence	924	384 (41.6%)	914	360 (39.4%)	953	373 (39.1%)	2791	1117 (40%)	0.287
Adherence to other treatments of interest									
Adherence to ADHD drugs	924	64.2 ± 32.7	914	62.4 ± 33.1	953	61.8 ± 32.7	2791	62.8 ± 32.8	0.226
Antidepressants	924	45 (4.9%)	914	45 (4.9%)	953	49 (5.1%)	2791	139 (5%)	0.786
Adherence to antidepressants	45	54.9 ± 32.8	45	62.8 ± 33.6	49	66.2 ± 29.5	139	61.5 ± 32.1	0.212
Anxiolytics	924	20 (2.2%)	914	19 (2.1%)	953	22 (2.3%)	2791	61 (2.2%)	0.829
Adherence to anxiolytics	20	42.1 ± 36.8	19	60.3 ± 29.9	22	49.6 ± 34.4	61	50.4 ± 34.1	0.225
Antipsychotics	924	38 (4.1%)	914	45 (4.9%)	953	36 (3.8%)	2791	119 (4.3%)	0.712
Adherence to antipsychotics	38	44.4 ± 36.3	45	46.1 ± 37.2	36	49.5 ± 37.5	119	46.6 ± 36.7	0.760
Hypnotics and sedatives	924	13 (1.4%)	914	12 (1.3%)	953	6 (0.6%)	2791	31 (1.1%)	0.107
Adherence to hypnotics and sedatives	13	65.3 ± 38.3	12	69.2 ± 36.1	6	60.4 ± 45	31	65.9 ± 37.6	0.838

Table 3: Adherence by type of drug and year.

Adherence	2015		2016		2017		2015-2017		p
	N	Mean ± SD	N	Mean ± SD	N	Mean ± SD	N	Mean ± SD	
Drug									
Methylphenidate	767	63.1 ± 32.9	728	60.7 ± 33.3	764	60.7 ± 32.7	2259	61.5 ± 33.0	0.236
Lisdexamfetamine	87	68.9 ± 30.8	120	66.1 ± 32.0	104	63.6 ± 32.9	311	66.0 ± 32.0	0.474
Atomoxetine	60	66.8 ± 32.8	65	72.0 ± 34.1	45	63.0 ± 34.6	170	67.8 ± 33.7	0.281
Modafinil	19	71.3 ± 38.0	21	66.1 ± 39.2	29	62.7 ± 37.8	69	66.1 ± 37.9	0.827
Guanfacine	0	n.a.	0	n.a.	26	82.2 ± 26.1	26	82.2 ± 26.1	n.a.
Total	933	64.0 ± 32.8	934	62.3 ± 33.4	968	61.8 ± 33.0	2835	62.7 ± 33.1	0.281

Table 4: Adherence by age group.

	6-14 y (n=1573)		15-19 y (n=610)		≥ 20 y (n=608)		Total (n=2791)		P
	N	n (%)	N	n (%)	N	n (%)	N	n (%)	
Year	1573		610		608		2791		0,244
2015		536 (34.1%)		190 (31.1%)		198 (32.6%)		924 (33.1%)	
2016		516 (32.8%)		202 (33.1%)		196 (32.2%)		914 (32.7%)	
2017		521 (33.1%)		218 (35.7%)		214 (35.2%)		953 (34.1%)	
Sex (female)	1573	388 (24.7%)	610	153 (25.1%)	608	263 (43.3%)	2791	804 (28.8%)	<0.001
Adherence to ADHD drugs									
Adherence rate categories	1573		610		608		2791		0.232
0		72 (4.6%)		57 (9.3%)		70 (11.5%)		199 (7.1%)	
1 - 49%		428 (27.2%)		225 (36.9%)		134 (22%)		787 (28.2%)	
50 - 79%		447 (28.4%)		138 (22.6%)		103 (16.9%)		688 (24.7%)	
≥80%		626 (39.8%)		190 (31.1%)		301 (49.5%)		1117 (40%)	
50% adherence (S)	1573	1073 (68.2%)	610	328 (53.8%)	608	404 (66.4%)	2791	1805 (64.7%)	0.029
80% adherence (S)	1573	626 (39.8%)	610	190 (31.1%)	608	301 (49.5%)	2791	1117 (40%)	0.004
Other treatments of interest									
Adherence to ADHD drugs	1573	64.8 ± 30.8	610	55.1 ± 33.8	608	65.4 ± 35.7	2791	62.8 ± 32.8	<0.001
Antidepressants (S)	1573	20 (1.3%)	610	12 (2%)	608	107 (17.6%)	2791	139 (5%)	<0.001
Adherence to antidepressants	20	61.1 ± 28.6	12	51.1 ± 33.7	107	62.7 ± 32.6	139	61.5 ± 32.1	0.413
Anxiolytics (S)	1573	3 (0.2%)	610	2 (0.3%)	608	56 (9.2%)	2791	61 (2.2%)	<0.001
Adherence to anxiolytics	3	33.3 ± 57.7	2	64.5 ± 20.5	56	50.9 ± 33.4	61	50.4 ± 34.1	0.568
Antipsychotics (S)	1573	59 (3.8%)	610	19 (3.1%)	608	41 (6.7%)	2791	119 (4.3%)	0.008
Adherence to antipsychotics	59	39.9 ± 36	19	43.1 ± 33.7	41	57.8 ± 37.3	119	46.6 ± 36.7	0.076
Hypnotics and sedatives (S)	1573	0 (0%)	610	2 (0.3%)	608	29 (4.8%)	2791	31 (1.1%)	<0.001
Adherence to hypnotics	0	n.a.	2	70.3 ± 42	29	65.6 ± 38.1	31	65.9 ± 37.6	0.772
n.a= no consumption data									

Table 5: Adherence by sex.

	Males (n=1987)		Females (n=804)		Total (n=2791)		P
	N	n (%)	N	n (%)	N	n (%)	
Age groups	1987		804		2791		0,000
6-14 y		1185 (59.6%)		388 (48.3%)		1573 (56.4%)	
15-19 y		457 (23%)		153 (19%)		610 (21.9%)	
≥ 20 y		345 (17.4%)		263 (32.7%)		608 (21.8%)	
Adherence to ADHD drugs							
Adherence rate categories	1987		804		2791		0.101
0		138 (6.9%)		61 (7.6%)		199 (7.1%)	
1-49%		577 (29%)		210 (26.1%)		787 (28.2%)	
50-79%		506 (25.5%)		182 (22.6%)		688 (24.7%)	
≥80%		766 (38.6%)		351 (43.7%)		1117 (40%)	
50% adherence (S)	1987	1272 (64%)	804	533 (66.3%)	2791	1805 (64.7%)	0.256
80% adherence (S)	1987	766 (38.6%)	804	351 (43.7%)	2791	1117 (40%)	0.013
Other treatments of interest							
Adherence to ADHD drugs	1987	62.2 ± 32.6	804	64.3 ± 33.3	2791	62.8 ± 32.8	0.062
Antidepressants (S)	1987	78 (3.9%)	804	61 (7.6%)	2791	139 (5%)	0.000
Adherence to antidepressants	78	56.8 ± 34.1	61	67.4 ± 28.5	139	61.5 ± 32.1	0.100

Anxiolytics (S)	1987	33 (1.7%)	804	28 (3.5%)	2791	61 (2.2%)	0.004
Adherence to anxiolytics	33	49 ± 36.5	28	52.2 ± 31.6	61	50.4 ± 34.1	0.711
Antipsychotics (S)	1987	103 (5.2%)	804	16 (2%)	2791	119 (4.3%)	0.000
Adherence to antipsychotics	103	45.6 ± 36.5	16	53.3 ± 38.4	119	46.6 ± 36.7	0.485
Hypnotics and sedatives (S)	1987	16 (0.8%)	804	15 (1.9%)	2791	31 (1.1%)	0.026
Adherence to hypnotics	16	70 ± 36.2	15	61.4 ± 39.8	31	65.9 ± 37.6	0.640

Discussion

Exposure to ADHD medication

Overall, we detected an annual prevalence of 0.3% of ADHD under pharmacological treatment for the period January 1, 2015 to December 31, 2017. By age group, treatment was most common in patients aged <25 years: 1.6% of males and 0.5% of females aged <15 years and 0.8% of males and of females in the 15-24 age group had been prescribed ADHD medication. Prevalence rates for childhood ADHD in the literature range from 2% to 18% and vary according to diagnostic criteria and setting (e.g. primary care versus hospitals) [1]. The estimated prevalence in adults is 4.4% according to a US study [14] and 3.4% (range 1.2%-7.3%) according to a nationwide study spanning 10 countries. ADHD is four times more common in boys than in girls [7]. In our cohort, the male to female ratio was 3:1 for children and 2:1 for adolescents aged 15-19 years. According to the 2015-2016 NSCH, 14% of boys and 6% of girls in the United States had ADHD [6].

The vast majority of patients were being treated with stimulant medication (methylphenidate in 79.7% of cases and lisdexamfetamine in 11%). Stimulant medication, combined with cognitive-behavior therapy, is generally the first-line treatment for children and adolescents with uncomplicated ADHD [2,9]. It is also the most widely used and prescribed treatment for adult ADHD [17]. Stimulant drugs are also the first choice of treatment for adult ADHD and their use is supported by data from over 40 studies involving 4793 individuals. As mentioned by Wilens, et al [17]: "Despite this relatively large body of evidence, however, much remains to be understood about the role of factors such as age, dosing, long-term adverse effects, and subgroup variations".

Comorbidity

Between 20% to 40% of patients with ADHD have anxiety disorders, while a third have concomitant depression or conduct disorders [4,18,19]. Between 20% and 45% of children with ADHD meet the diagnostic criteria for at least one anxiety disorder [8]. Five percent of patients under treatment for ADHD in our series were taking antidepressants, 2.2% anxiolytics, 1.1% hypnotics, and 4.3% antipsychotics. These rates are lower than the rates reported above, but as we only analyzed patients who had been prescribed ADHD medication, our population does not include patients not receiving pharmacological treatment or patients not yet diagnosed.

Adherence to treatment

Good adherence to ADHD medication, defined as an adherence rate of ≥80%, was observed for 40% of the patients in our series,

and the mean ± SD adherence rate for the overall group was 63% ± 32.8%. Adherence did not vary significantly according to type of medication, but we did observe a particularly high rate for guanfacine (82%), but this was based only on data for 2017, when the drug was launched. The COMPLY study is a prospective, open-label, 12-month observational study that assessed medication adherence in children and adolescents aged 6-17 years with ADHD using the Pediatric Compliance Self-Rating instrument and the first four items of the Medication Adherence Rating Scale (MARS). No significant differences were found between adherence to psychostimulants and adherence to non-stimulants [20]. We observed significant differences in adherence according to age. Adherence was poorest in the 15-19 group (31.1% vs 39.8% for under-15s and 49.5% for those aged >20 years). The authors of a Swedish study of ADHD medication and criminality in individuals aged >16 years found an association between increased criminality and non-adherence as well as a reduction in criminality during treatment and an increase off treatment [21]. Their findings highlight the potential benefits of interventions designed to improve treatment compliance, but they also show that benefits are lost when treatment is discontinued [22]. Irregular use of medication is common in adolescents. While adult patients are generally responsible for their own health, health care decisions for children are usually taken by parents. When a child reaches adolescence, however, their beliefs about treatment may change, leading them to skip doses [23]. Self-reported adherence tends to be overestimated by parents, adolescents, and young adults [24]. Suboptimal medication adherence is more likely to be detected when a teenager is asked "How many pills have you skipped this month?" rather than "Have you skipped any pills this month?" [25]. An observational study of 51 university students with ADHD in the United States found an overall adherence rate of 54%, but this varied between 34% and 68% depending on the year they were in and the time of the semester [25]. Respondents' perceptions of the burden of medication use tend to be negative. Its potential short- and long-term adverse effects also cause concern and are often mentioned by this population as the reason for discontinuation. Improvements in shared decision-making among practitioners, parents, and young patients, and careful monitoring of treatment effectiveness and safety, are necessary in order to optimize outcomes [26]. Studies in children and adolescents have reported adherence rates over a period of 12 months ranging from 56% for long-acting stimulants to 67% for atomoxetine, a non-stimulant [27]. All the studies evaluated adherence as the ratio between number of days of medication supplied and number of days the medication should have been taken during a prespecified period. This method, MPR, is the same as that used in our study

[28]. In our series, female patients adhered significantly better to ADHD treatment ($\geq 80\%$ adherence rate of 43.7% vs. 38.6% for males). Other studies have also reported better adherence rates among women together with differences in treatment compliance according to age [29]. The typical cutoff to define good adherence in these studies is $\geq 80\%$ [30]. Marcus, et al [31], for example, found that 18% of intermediate-grade school children adhered well to treatment ($\geq 70\%$ adherence per marking period), while Hodgkin, et al. [32] found a mean adherence rate of 49% among similarly aged adolescents. In our series, use of antidepressants, anxiolytics, and hypnotics was significantly higher in females, while that of antipsychotics was significantly higher in males. These differences are similar to those reported for the general population [33]. Our study has some limitations. As we only analyzed data from the Spanish National Healthcare system, we may have missed out on prescriptions issued in private practice or within occupational health insurance schemes. Nonetheless, we believe that these prescriptions will have accounted for only a small proportion of all prescriptions in the region, as the Spanish healthcare system offers universal coverage [34]. By not analyzing medical records, we may also have missed cases not included in the databases analyzed. Finally, we did not investigate clinical causes of poor adherence and this information is important for addressing this problem. These limitations should be considered when evaluating our results.

Conclusion

In conclusion, we have described a cohort of patients receiving pharmacological treatment for ADHD. The overall prevalence, at 0.3%, is, in our opinion, low. Males were three times more likely than females to be prescribed ADHD medication. The most widely prescribed drug was methylphenidate and the most widely used drugs for concomitant psychiatric disorders were antidepressants (5%) and antipsychotics (4.2%).

Overall adherence was low, at 63%, and less than half the patients were $\geq 80\%$ adherent.

Adolescent Boys had the Worst Adherence Rates

More studies are needed to analyze treatment compliance in ADHD, particularly among more vulnerable groups, and to investigate interventions that will favor compliance.

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