Attention Deficit Hyperactivity Disorder: Case Series of a Portuguese Liaison Pedopsychiatry Department

Daniela Brandão[1], Teresa Correia[2], Inês Cardoso[2], Zulmira Correia[2], Filipa Alves[1]

Port J Pediatr 2019;50:103-9
DOI: https://doi.org/10.25754/pjp.2019.13482

Abstract

Introduction: Attention deficit hyperactivity disorder is a chronic neurodevelopment condition with increasing importance. Symptoms mainly affect school-aged children, with social, family, and school functioning implications. This study characterizes a cohort of patients with attention deficit hyperactivity disorder followed at a liaison pedopsychiatry clinics.

Methods: Retrospective study of children and adolescents with attention deficit hyperactivity disorder followed in liaison child psychiatry clinics in a hospital in northern Portugal between October and December 2016. Data was collected from the electronic medical records. Studied variables included were age, sex, clinical presentation of attention deficit hyperactivity disorder, family and personal history, psychiatric and medical comorbidities as well as reason for referral and source of referral, treatment, and side effects.

Results: The study included 221 children and adolescents with a diagnosis of attention deficit hyperactivity disorder. 72.9% of patients were male, average age 12.4 years, with 37.1% being 10-12 years old; 74.2% were resident in Porto district. In 35.3% of the cases, referral was made by neuropediatricians and 18.6% by general pediatricians. Behavioral problems and concentration difficulties (27.6%) and learning disabilities (22.6%) were the most frequent reasons for referral. He patients most often presented as a mixed subtype (48.4%) and 85.1% were under medication. The most frequent psychiatric comorbidities were intellectual development disorder (35.4%), which was followed by oppositional defiant disorder/behavioral problems (20.3%). The cognitive evaluation was performed in 73.8%, and 57.1% of the cases had a lower than average intelligence quotient. Personal history related to attention deficit hyperactivity disorder was identified in 21.7% and family history in 14%. Regarding the medical comorbidities, the most prominent were pulmonary and renal conditions, both in 20.4% of cases.

Discussion: Attention deficit hyperactivity disorder affects 36.8% of the children and adolescents followed in liaison pedopsychiatry clinics between October and December of 2016, with a high incidence among 10-12 years old males, with a predominance of mixed presentation. Behavioral problems, concentration difficulties, and learning disabilities were in most cases the reason for referral. Early intervention is essential in order to control the symptoms thereby improving the academic and psychosocial course.

Keywords: Adolescent; Attention Deficit Disorder with Hyperactivity/diagnosis; Attention Deficit Disorder with Hyperactivity/epidemiology; Child; Portugal

Introduction

Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder with a high prevalence in children and adolescents, which has negative effects on their school, family, and social functioning. It is mainly characterized by attention deficit, hyperactivity, and impulsivity.[1] According to the American Psychiatric Association, it is estimated that most cultures have about 5% of children and 2.5% of adults diagnosed with ADHD.[2] In Portugal, there are no epidemiological studies, however we have some indicators that parallel the international data. Some studies conducted at the University of Coimbra in 1990 and at University of Lisbon in 2000, showed a prevalence between 4% and 5% in school-age children.[3] This disorder is more frequent in males, but it can be justified by the fact that the diagnosis in females occurs later because of the higher prevalence of attention deficit with symptoms of impulsivity rather than hyperactivity.[2,4,5] Despite that fact, this difference between genders becomes less evident in adolescence.[5] It should be noted that approximately 60%-80% of children with ADHD maintain their symptoms in both adolescence and adulthood.[1]

1. Department of Psychiatry and Mental Health, Unidade Local de Saúde do Alto Minho, Viana do Castelo, Portugal
2. Department of Liaison Pedopsychiatry, Centro Materno-Infantil do Norte, Centro Hospitalar do Porto, Porto, Portugal
Corresponding Author
Daniela Brandão
danielasilvabrandao11@gmail.com
Rua Divino Salvador, 746; 4730-410-Vila Verde, Braga, Portugal
Received: 16/11/2017 | Accepted: 29/10/2018

Regarding the etiology, it seems to point to a complex, highly hereditary and multifactorial etiology. Studies have shown a higher family incidence in close family members and a two to eight times higher risk in first-degree relatives.[6,7] In addition, there is also evidence of the importance of exposure to prenatal and perinatal factors (prematurity, very low birth weight, neonatal sepsis, exposure to maternal stress like anxiety/depression, family alcoholism), to environmental toxins, nutritional factors (zinc deficiency, polyunsaturated fatty acids), and psychological factors (low income, parental adversities) that relate in some way to ADHD.[8] The presence of neurocognitive deficits in the child is also a risk factor, as the presence of brain injury, epilepsy, or cognitive deficit.[2]

Diagnosis is not easy, as there are no specific tests or specific markers, and it is based essentially on the American Academy of Psychiatry clinical criteria.[2] According to those, the presence of the predominant symptom makes it possible to differentiate ADHD into three categories: predominantly inattentive, predominantly hyperactive/impulsive, and mixed.[2]

The assessment includes a thorough clinical history (including personal and family history), complete physical examination that includes neurological examination, cognitive assessment - Wechsler Intelligence Scale for Children, 3rd edition (WISC-III), neuropsychological assessment - Wisconsin Card Sorting Test (WCST), D2 Test of Attention, and behavioral assessment as well as the impact of symptoms on various daily activities and in different settings (home, school, among others). In the behavioral evaluation, it is essential to get information from several sources (parents and teachers), and it can be done by applying the Conners questionnaire to parents and teachers.[9]

Faced with the suspicion of a cognitive deficit or specific learning difficulties, a cognitive and adaptive function evaluation can be considered. The literature points out that children with ADHD often have low school performance compared to those without ADHD.[10]

There is a necessity to take into account that children with ADHD often have associated comorbidities, leading to a greater functional impairment, and a reduced response to treatment. According to the literature, up to 52% of children and adolescents present at least one psychiatric disease comorbid to ADHD.[11] Among the most common are behavioral disorder (30%) and/or opposition and challenge disorder (35%), depression (30%), anxiety (20%-30%), or learning disorders (20%-60%).[1,4] Differential diagnosis is essential for conditions that present symptoms similar to ADHD, such as hearing problems, sleep disturbances, epilepsy, thyroid disfunction, or iron deficiency anemia.[12]

The ADHD treatment should be multidisciplinary, including a psychotherapeutic and/or psychopharmacological intervention. Psychotherapeutic interventions include psychoeducation, behavioral therapy, cognitive-behavioral therapy, interventions in school settings, social skills training, family therapy, or parenting skills training. The choice should be based on the main impact both in individual and in socio-family characteristics in each case. For the psychopharmaceutical intervention, in Portugal methylphenidate (first line drug of choice) and atomoxetine (less effective but with less potential for abuse) are approved for the treatment of ADHD.[13]

Different formulations of methylphenidate are available according to the duration of action: immediate (four hours, Rubifen®), intermediate (six to eight hours, Ritalin LA®) and prolonged (10 to 12 hours, Concerta®). In the presence of personal or familial cardiac conditions, an electrocardiogram should be performed before treatment.[14] Despite methylphenidate and atomoxetine good tolerance, there are reports of possible side effects such as decreased appetite, abdominal pain, headache, irritability, or insomnia.[1] In addition to these drugs, there are still other options with less evidence of efficacy, such as bupropion, modafinil, and noradrenergic antidepressants, which are used off-label.[15] Concerning psychotherapeutic intervention, the most evident is cognitive-behavioral therapy, not only for ADHD, but also for some associated comorbidities.[16,17]

ADHD has become recognized as a public health problem, being associated with significant and broadly variable impairments that affect not only the patients and their family, but also the community. Early treatment is important to control symptoms leading to the improvement of academic performance and social skills.

Methods

A retrospective study of a cohort of children with the diagnosis of ADHD, followed in the child psychiatry clinic of the liaison department of a hospital located in the North Region of Portugal, from October 1 to December 31, 2016. The following independent variables were collected from the electronic medical records: age at the time of the first visit, sex, district, past medical history (prematurity, intrauterine growth restriction, epilepsy), family history (ADHD, epilepsy, psychiatric disorders), ADHD clinical presentation subtype, source and reason for referral, psychiatric and medical results of cognitive assessment (WISC-III), prescribed treatment and its side effects. A descriptive statistical analysis was performed in Microsoft Excel, version 2016.

Results

During a 12 month period, 601 patients were observed in the liaison child psychiatry clinic at Centro Materno-Infantil do Norte (Portugal). From these, 221 (36.8%) presented with ADHD, they were aged between 7 and 18 years and the majority were males (72.9%, n = 161). At the visit, 37.1% (n = 82) of the patients were between 10 and 12 years old (Fig. 1). Most of the patients were residents in the Porto district (74.2%, n = 164) (Fig. 2). It should be noted that the clinical reassessment of patients usually occurs about one month after the introduction of psychotropic drugs and regularly each six months after clinical stabilization.

The referral was made mainly by neuropediatricians (35.3%, n = 78), followed by general pediatricians in 18.6% (n = 41) (Table 1). It should be noted that some of the children were already followed in child psychiatry at a stage prior to the diagnosis of ADHD and, in 5% (n = 11), it was not possible to identify the source of referral, since they occurred prior to the implementation of electronic medical records. The reasons for referral were essentially behavioral changes/concentration difficulties (27.6%, n = 61) and learning difficulties (22.6%, n = 50) (Table 2). The predominant symptoms reported by the parents and teachers, by clinical evaluation and later on by filling out the Conners questionnaire (reviewed version, reduced form - adapted to the Portuguese population), allowed to differentiate the clinical presentation, with the mixed subtype (48.4%, n = 107) being the most frequent, followed by the predominantly inattentive presentation in 43% (n = 95), and, to a lesser extent (8.6%, n = 19), the predominantly hyperactive/impulsive presentation (Fig. 3).

About 85.1% (n = 188) were medicated for ADHD and methylphenidate was the drug of choice (98.9%, n = 186). In those who were medicated no side effects were reported in about 66% of cases. Anorexia/weight loss (14.9%, n = 28) and depressive symptoms/apathy (9.0%, n =17) were the most frequent side effects related to the prescribed medication (Table 3). The lack of improvement with treatment or the occurrence of significant side effects were the main reasons for not being medicated. In the medication group, there was improvement in the school results, either by the improvement in the

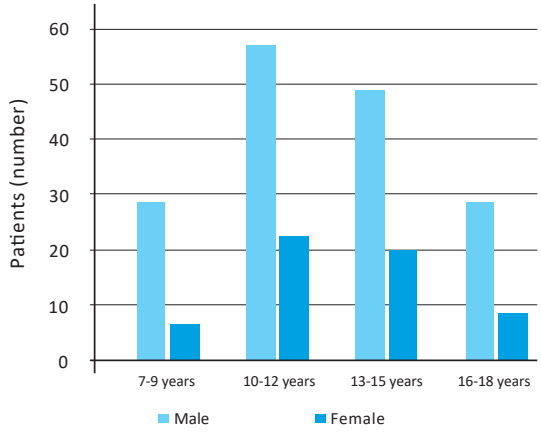


Figure 1. Age distribution of patients diagnosed with attention deficit hyperactivity disorder by gender.

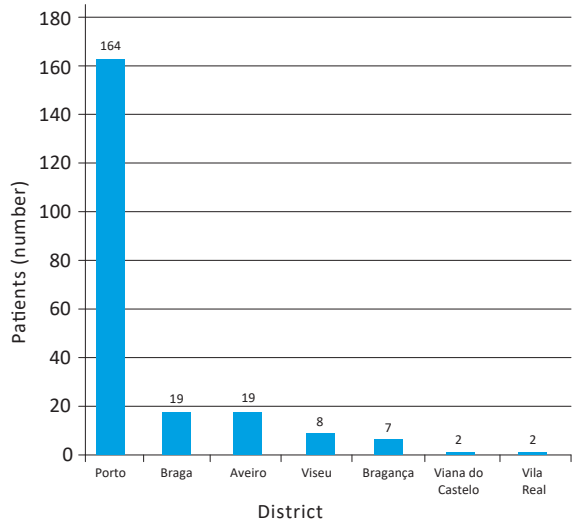


Figure 2. Distribution by residence district of patients diagnosed with attention deficit hyperactivity disorder.

Table 1. Referral source of patients diagnosed with attention deficit hyperactivity disorder

Referral source	n	%
Neuropediatrics	78	35.29
General pediatrics	41	18.55
Nephrology	15	6.79
Not determined	11	4.98
Psychology	9	4.07
Immunoallergology	8	3.62
Stomatology	7	3.17
Gastroenterology	7	3.17
Pneumology	7	3.17
Metabolic diseases	6	2.71
Otolaryngology	6	2.71
Physiatry	5	2.26
Urology	5	2.26
Development	3	1.36
Endocrinology	3	1.36
Emergency service	3	1.36
Dermatology	2	0.9
Immunology	2	0.9
Inpatient unit	2	0.9
Genetics	1	0.45

Table 2. Reason for referral of patients diagnosed with attention deficit hyperactivity disorder.

Reason for referral	n	%
Behavioral changes + difficulties in concentration	61	27.60
Learning difficulties	50	22.62
Behavioral changes	47	21.27
Concentration difficulties	45	20.36
Anxiety	15	6.79
Sleep changes	6	2.71
Enuresis/encopresis	2	0.9
Tics	1	0.45
Depressive symptomatology	1	0.45
Headaches	1	0.45

school performance or by the decrease of the behavioral complaints.

In this study, about 35.8% (n = 79) presented some psychiatric comorbidities, which are presented in Fig. 4. Predominant conditions were the intellectual development disorder (35.4%; n = 28) followed by opposition and challenge/behavioral disorders (20.3%, n = 16).

Cognitive assessment was performed in 163 cases (73.8%), with an intelligence quotient lower than 80 (below average) in 93 children (57.1%).

About 21.7% (n = 48) of children had a past medical history related to ADHD, especially epilepsy (60.4%; n = 29) (Fig. 5). In some cases, the child/adolescent presented more than one personal history related to ADHD.

About 13.6% (n = 30) had a family history related to ADHD. The data show the family history related to ADHD, especially depressive disorder and ADHD (Fig. 6).

Regarding the medical diagnoses, 73.3% (n = 162) presented past medical conditions, while 26.7% (n = 59) had no medical comorbidities. It is noteworthy that the study has been conducted in the context of liaison pediatrics and that may justify the high rate of associated medical conditions and the type of conditions.

Since the Centro Materno-Infantil do Norte is a reference center for renal diseases, that may explain why it was present in 20.4% (n = 33) of the cases. Pulmonary conditions were equally present, followed by otorhinolaryngological conditions, probably due to the high frequency of these specific conditions in the pediatric age (Table 4).

Discussion

Through the analysis of the results of this study, the male predominance of ADHD is in accordance with the published literature.[2,5] The majority of the children in this study were between 10 and 12 years of age, with a

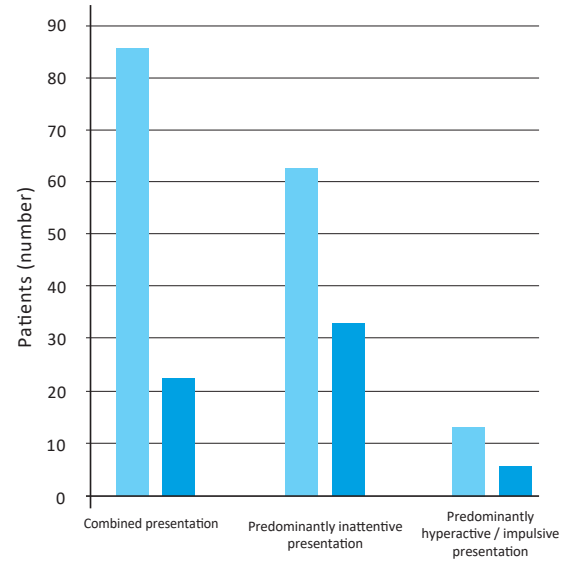


Figure 3. Attention deficit hyperactivity disorder clinical presentation subtype by gender

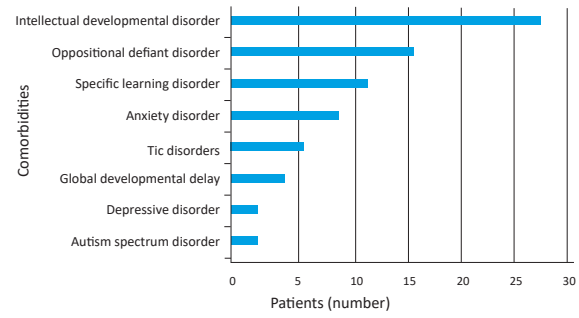


Figure 4. Associated psychiatric comorbidities of patients diagnosed with attention deficit hyperactivity disorder.

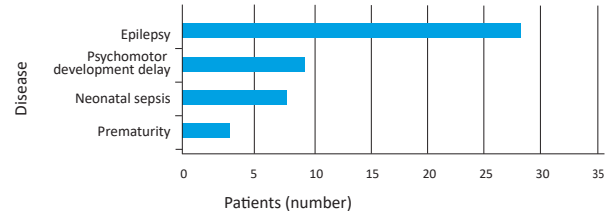
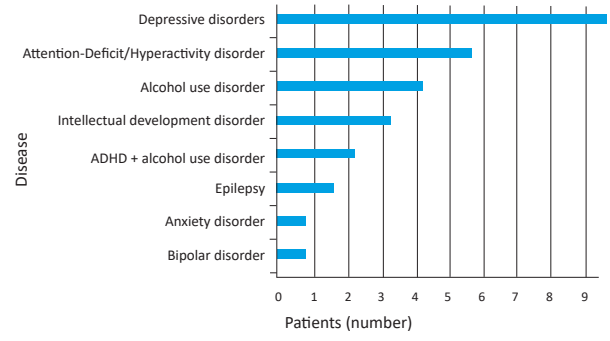


Figure 5. Past medical history of patients diagnosed with attention deficit hyperactivity disorder.



ADHD - attention deficit hyperactivity disorder.

Figure 6. Family history of patients diagnosed with attention deficit hyperactivity disorder.

Table 3. Medication instituted and adverse effects of patients diagnosed with attention deficit hyperactivity disorder

Drug	n	%
None	33	14.93
Methylphenidate	186	98.94
Atomoxetine	2	0.9
Adverse effects	**n**	**%**
None	124	65.96
Anorexia/weight loss	28	14.89
Depressive symptomatology/apathy	17	9.04
Sleep changes	6	3.19
Tics	5	2.66
Headaches	5	2.66
Psychomotor agitation	2	1.06
Palpitations	1	0.53

predominance of the mixed clinical presentation, which agrees with the results of other studies.[18,19]

Referral was made mostly through the neuropediatrics and general pediatrics physicians of the same hospital where the patients were followed for other reasons. The referral from neuropediatrics can be explained by the fact that several symptoms are common to neurological and psychiatric diseases, and because neurodevelopmental disorders (ADHD and intellectual development disorder) are often initially screened for neuropediatric causes and only later for pedopsychiatric origin, as in patients refractory to first line therapy and/or with severe behavioral complaints.

The main reasons for referral were behavioral changes/difficulties of concentration and learning difficulties. Of the personal medical history, epilepsy stands out. In addition, the presence of psychiatric disorders was also observed in the relatives of children with ADHD (parents and siblings), with ADHD and depression being the conditions that were most common. Before a clinical suspicion of ADHD, it is essential that cognitive, neuropsychological, and behavioral evaluations are conducted. In this study, there was a predominance of lower than average intelligence quotient, which in some cases may be influenced by the attention deficit and may not represent the true intellectual level of the child. Some of the patients had one or more psychiatric comorbidities, and the most frequent were intellectual development disorder, behavioral disorder, and oppositional and challenge disorder in this study. As verified in the literature,[13] this study also shows that methylphenidate is the treatment of choice, with the most side effects being anorexia/weight loss and depressive symptoms.

The ADHD affects 36.8% of the children and adolescents followed in liaison pedopsychiatry consultations between October and December of 2016. Early intervention is essential in order to control the symptoms, improving the academic and psychosocial courses. Given the complexity of these patients' comorbidities, there is an absolute and growing need to attain multidisciplinary teams in order to diagnose and treat this type of disorder early and adequately.

Table 4. Other medical diagnoses of patients diagnosed with attention deficit hyperactivity disorder

Other medical diagnosis	n
Pulmonary disease (asthma/obstructive sleep apnea syndrome/rhinitis)	33
Renal disease	33
Otorhinolaryngologic disease (surgeries/deafness sensorineural)	19
Endocrine disease (early puberty, diabetes mellitus 1, thyroid disease, obesity)	16
Neurological disease (migraine, cerebral palsy)	15
Genetic pathologies (atopy, chronic granulomatosis, syndrome Beckwith-Wiedemann)	8
Metabolic disease	7
Gastric disease	6
Cardiovascular disease (cardiac conditions/arterial hypertension)	6
Motion sickness	4
Neurocutaneous pathologies (diffuse alopecia/areata, neurofibromatosis type 1)	4
Congenital malformations (corpus callosum agenesis, myelomeningocele, Arnold Chiari malformation)	3
Osteoarticular disease	3
Infectious disease (immunodeficiency virus 1)	2
Neuromuscular disease (Duchene/Becker muscular dystrophy)	2
Hematologic disease (lymphangioma)	1

WHAT THIS STUDY ADDS

- Describes the characteristics of patients with attention deficit hyperactivity disorder followed in a liaison pedopsychiatry clinic.
- Attention deficit hyperactivity disorder is a neurodevelopmental disorder with a high prevalence in children and adolescents that negatively affects several domains.
- Before a clinical suspicion of attention deficit hyperactivity disorder, cognitive, neuropsychological, and behavioral evaluation are essential.
- Given the complexity of these patients' comorbidities, multidisciplinary teams are necessary in order to diagnose and treat this type of disorder early and adequately.

Conflicts of Interest

The authors declare that there were no conflicts of interest in conducting this work.

Funding Sources

There were no external funding sources for the realization of this paper.

Provenance and peer review

Not commissioned; externally peer reviewed

Consent for publication

Consent for publication was obtained.

Confidentiality of data

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

References

1. Floet AM, Scheiner C, Grossman L. Attention-deficit / hyperactivity disorder. Pediatr Rev 2010;31:56-6. doi: 10.1542/pir.31-2-56.
2. American Psychiatric Association. Manual de diagnóstico e estatística das perturbações mentais. 5ª ed. Lisboa: Climepsi Editores; 2014.
3. Rodrigues A, Antunes NL. Mais forte do que eu. Alfragide: Lua de Papel; 2014.
4. Krull KR. Attention deficit hyperactivity disorder in children and adolescents: Epidemiology and pathogenesis [accessed 3 February 2017]. Available at: http://www.uptodate.com
5. Cordinhã AC, Boavida J. A criança hiperativa: Diagnóstico, avaliação e intervenção. Rev Port Clin Geral 2008;24:577-89.
6. Poeta LS, Neto FR. Estudo epidemiológico dos sintomas do transtorno do défice de atenção / hiperatividade e transtornos do comportamento em escolas da rede pública de Florianópolis usando o EDAH. Braz J Psychiatry 2004;26:150-5. doi: / S1516-44462004000300004.
7 Faraone S, Perlis R, Doyle AE, Smoller JW, Goralnick J, Holmgren MA, et al. Molecular genetics of attention-deficit / hyperactivity disorder. Biol Psychiatr 2005;57:1313-23. doi: 10.1016/j.biopsych.2004.11.024.
8. Thapar A, Cooper M. Attention deficit hyperactivity disorder. Lancet 2016;387:1240-50. doi: 10.1016/S0140-6736(15)00238-X.
9. Novais R. Perturbação de hiperatividade e défice de atenção (PHDA): Excesso de diagnósticos? Rev Clín Hosp Prof Dr Fernando Fonseca 2014;2:40-1.
10. Siqueira C, Gurgel-Giannetti J. Mau desempenho escolar: Uma visão atual. Rev Assoc Med Bras 2011;57:78-87.
11. Jensen CM, Steinhausen HC. Comorbid mental disorders in children and adolescents with attention-deficit / hyperactivity disorder in a large nationwide study. Atten Defic Hyperact Disord 2015;7:27-38. doi: 10.1007/s12402-014-0142-1.
12. National Institute for Health and Clinical Excellence. Attention deficit hyperactivity disorder: Diagnosis and management of ADHD in children, young people and adults. Clinical guideline GC72. London: NICE; 2008.
13. Wolraich M, Brown L, Brown RT, DuPaul G, Earls M, Feldman HM, et al. ADHD: Clinical practice guideline for the diagnosis, evaluation, and treatment. Pediatrics 2011;128:1007-22. doi: 10.1542/peds.2011-2654.
14. Berger S. Cardiac evaluation of patients receiving pharmacotherapy for attention deficit hyperactivity disorder [accessed 3 February 2017]. Available at: http://www.uptodate.com
15. Vaughan BS, March JS, Kratochvil CJ. The evidence-based pharmacological - treatment of pediatric ADHD. Int J Neuropsychopharmacol 2012;15:27-39. doi: 10.1017/S1461145711000095.
16. Volkow ND, Swanson JM. Adult attention deficit-hyperactivity disorder. N Engl J Med 2013;369:1935-44. doi: 10.1056/NEJMcp1212625.
17. Santos LF, Vasconcelos LA. Transtorno do déficit de atenção e hiperatividade em crianças: Uma revisão interdisciplinar. Psic Teor Pesq 2010;26:717-24. doi: 10.1590/S0102-37722010000400015.
18. Cardoso FL, Sabbag S, Beltrame TS. Prevalência de transtorno de défice de atenção / hiperactividade em relação ao género de escolares. Rev Bras Cineantropometr Desempenho Hum 2007;9:50-4.
19. Fontana R, Vasconcelos M, Werner J, Góes F, Liberal E. Prevalência de TDAH em quatro escolas públicas brasileiras. Arq Neuropsiquiatr 2007;65:134-7. doi: 10.1590/S0004-282X2007000100027.

Perturbação de Hiperatividade e Défice de Atenção: Casuística de um Serviço de Pedopsiquiatria de Ligação Português

Resumo:

Introdução: A perturbação da hiperatividade e défice de atenção é uma patologia do neurodesenvolvimento considerada crónica e tem assumido uma importância cada vez mais significativa, com os sintomas afetando sobretudo as crianças em idade escolar, com repercussões no funcionamento social, familiar e escolar. Este estudo caracteriza os pacientes com diagnóstico de perturbação da hiperatividade e défice de atenção seguidos em consulta de pedopsiquiatria de ligação.

Métodos: Estudo retrospetivo num grupo de crianças e jovens com diagnóstico de perturbação da hiperatividade e défice de atenção seguidos em consulta de pedopsiquiatria de ligação num hospital do Norte de Portugal, entre outubro e dezembro de 2016. A recolha dos dados foi elaborada através da consulta do processo clínico informatizado. Foram analisadas a idade, sexo, apresentação clínica de perturbação da hiperatividade e défice de atenção, antecedentes familiares e pessoais, comorbilidades psiquiátricas e médicas, motivo e origem da referenciação, tratamento instituído e respetivos efeitos laterais.

Resultados: Foram observados 221 crianças e jovens com diagnóstico de perturbação da hiperatividade e défice de atenção, sendo 72,9% do sexo masculino. A idade média foi de 12,4 anos, sendo que 37,1% apresentava idade compreendida entre os 10-12 anos. Residem 74,2% no distrito do Porto. Em 35,3%, a referenciação foi realizada pela consulta de neuropediatria e 18,6% pela consulta de pediatria geral, sendo os motivos mais frequentes as alterações comportamentais / dificuldades de concentração (27,6%) e as dificuldades de aprendizagem (22,6%). Quanto à apresentação clínica, a maioria correspondia à mista (48,4%) e 85,1% estavam medicados. As comorbilidades psiquiátricas mais frequentes foram perturbação do desenvolvimento intelectual (35,4%), seguido da perturbação de oposição e de desafio / alterações comportamentais (20,3%). A avaliação cognitiva foi realizada em 73,8%, sendo que 57,1% apresentaram quociente intelectual inferior à média. Foram identificados antecedentes pessoais relacionados com perturbação da hiperatividade e défice de atenção em 21,7% e antecedentes familiares relacionados com perturbação da hiperatividade e défice de atenção em 14,0%. Quanto às comorbilidades médicas, as mais proeminentes foram a patologia pulmonar e renal, ambos com 20,4%.

Discussão: A perturbação da hiperatividade e défice de atenção afeta 36,8% das crianças e adolescentes seguidos em consulta de pedopsiquiatria de ligação entre outubro e dezembro de 2016, com elevada incidência no sexo masculino com predomínio da apresentação mista. As alterações comportamentais, dificuldades de concentração e de aprendizagem foram na maioria dos casos, o motivo de referenciação à consulta.

Palavras-Chave: Adolescente; Criança; Portugal; Transtorno do Défice de Atenção com Hiperatividade/diagnóstico; Transtorno do Défice de Atenção com Hiperatividade/epidemiologia