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REVIEW ARTICLE

Attention deficit-hyperactivity disorder, comorbidities, and risk situations☆

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KEYWORDS
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Urgency;
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Abstract

Objective: Attention deficit/hyperactivity disorder (ADHD) is highly prevalent, and its symptoms often represent a significant public health problem; thus, the aim of this study was to verify emergency situations caused by certain comorbidities, or by exposing the patient to a higher risk of accidents.

Data source: A literature search was carried out in the PubMed database between the years 1992 and 2012, using the key words “adhd”, “urgency”, “comorbidity”, “substance disorder”, “alcohol”, “eating disorder”, “suicide”, “trauma”, “abuse”, “crime”, “internet”, “videogame”, “bullying”, and their combinations. The selection considered the most relevant articles according to the scope of the proposed topic, performed in a non-systematic way.

Data synthesis: Several situations were observed in which ADHD is the most relevant psychiatric diagnosis in relation to its urgency, such as the risk of accidents, suicide risk and addition, exposure to violence, or risk of internet abuse or sexual abuse; or when ADHD is the most prevalent comorbidity and is also correlated with emergency situations, such as in bipolar and eating disorders.

Conclusions: The results show several comorbidities and risk situations involving the diagnosis of ADHD, thus reinforcing the importance of their identification for the adequate treatment of this disorder.

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PALAVRAS-CHAVE
Transtorno de déficit de atenção/hiperatividade;
Urgência;
Comorbidade

Transtorno de *déficit* de atenção/hiperatividade, comorbidades e situações de risco

Resumo

Objetivo: O transtorno de *déficit* de atenção/hiperatividade (TDAH) apresenta alta prevalência, e seus sintomas apresentam-se frequentemente como um problema de saúde pública considerável. Assim, o objetivo desta revisão é verificar estas situações de urgência provocadas por determinadas comorbidades, ou por expor o paciente a um maior risco de acidentes.

Fonte dos dados: Foi realizada uma pesquisa bibliográfica na base de dados PubMed entre os anos de 1992 e 2012, utilizando os descritores "adhd", "urgency", "comorbidity", "substance disorder", "alcohol", "eating disorder", "suicide", "trauma", "abuse", "crime", "internet", "videogame", "bullying", e suas combinações. A seleção dos artigos considerou aqueles mais relevantes de acordo com a abrangência do tema proposto, de forma não sistemática.

Síntese dos dados: Foram encontradas diversas situações em que o TDAH é o diagnóstico psiquiátrico mais relevante em relação à urgência, como risco de acidentes, risco de suicídio e adição, exposição à violência ou risco de abuso de internet ou abuso sexual; ou então o TDAH é a comorbidade mais prevalente e está igualmente correlacionada à urgência, como no transtorno de humor bipolar e nos transtornos alimentares.

Conclusões: Nossos resultados mostram diversas comorbidades e situações de risco envolvendo o diagnóstico de TDAH e, assim, reforçam a importância de serem reconhecidas para um tratamento adequado deste transtorno.

Introduction

Attention deficit/hyperactivity disorder (ADHD) is characterized by symptoms of inattention, hyperactivity, and impulsivity, according to the Diagnostic and Statistical Manual of Mental Disorders - 4th Edition (DSM-IV).[1] The criteria are similar to those used by the World Health Organization (WHO),[2] but the nomenclature used in the latter is hyperkinetic disorder. It is a psychiatric disorder of major public health importance, considering the problems it causes during either childhood or adolescence, at school; during adulthood, at work; or both, regarding relationships with others.[3-5]

However, a patient with symptoms of ADHD will hardly ever be evaluated in the emergency room, even in emergency situations, will not be evaluated specifically because of the symptoms. It is very likely that a patient with ADHD will be evaluated due to the damage caused by these symptoms. Thus, a patient will not be evaluated due to inattention, but because of an accident that was caused by this symptom. The patient won't be evaluated due to impulsivity, but will have a history of abuse of the Internet and video games, for instance. Thus, it is necessary to assess whether and how a person with ADHD can be considered as being in an emergency situation, defined as the occurrence of an unexpected health problem, whether or not potentially life-threatening, in which the patient requires immediate medical attention, according to the Federal Council of Medicine.[6]

Obviously, a disorder as important as ADHD cannot be summarized to one or two symptoms. The diagnosis of ADHD is dimensional, which means that symptoms of inattention and/or hyperactivity and impulsivity can occur in anyone, but after a certain number of symptoms and associated harm, the individual will be classified as having the disorder. Thus, not every person who suffers an accident due to lack of attention will be classified as having ADHD. It is important, however, in a situation of risk – having suffered an accident – to assess the situation, and to evaluate why the individual was careless to the point of putting himself/herself at risk, as well the frequency of such events, the damage, and the occurrence of other ADHD symptoms, taking into account the differential diagnosis and comorbidities.

In the case of ADHD, patients who engage in risky behaviors are often treated initially by a pediatrician or physician that treats adults in primary care or in the emergency/urgency department; a careful and objective evaluation can result in adequate referral and provide important assistance for the patient. According to Culpepper,[7] the primary care physician should be able to confirm a diagnosis of ADHD, identify comorbidities and other initial problems, and provide the initial care to this patient, taking into account family influences. The importance of primary care is also demonstrated by Faber et al.[8] in their study, in which the use of stimulants to treat ADHD in children and adolescents (up to age 16) was primarily initiated by child psychiatrists in 51% of cases; however, in 32% of the cases, treatment was initiated by

pediatricians, and in 61% of cases the prescriptions were repeated by general practitioners.

An article from the American Academy of Pediatrics and the American College of Emergency Physicians[9] considered, among other health problems, early diagnosis of patients with ADHD as of vital importance in emergency services, emphasizing how patients with ADHD may be at risk. Furthermore, the use of health services by individuals with ADHD throughout life has a major economic impact,[10] as it is one of the disorders most often observed in primary care.[11] Another important factor is the high rate of comorbidities in ADHD, with the onset of psychiatric disorders as early as childhood, such as bipolar disorder, major depressive disorder, oppositional defiant disorder, conduct disorder, and substance abuse disorder.[12] The presence of comorbidities also occurs in adulthood.[13]

Epidemiology

A recent meta-analysis study,[14] encompassing 102 studies with a total of 171,756 subjects up to 18 years in all regions of the world, found a prevalence of ADHD of 5.29%. The findings of this study suggest that the geographical location has a limited role in the variability of prevalence data from the included studies, and that can best be explained by the heterogeneity of the methodology applied in different studies. It is expected that up to 60% of individuals with ADHD persist with this disorder into adulthood.[15] In Rio Grande do Sul, Rohde et al.[16] found a prevalence of 5.8% of ADHD in a sample of adolescent students. In Pelotas, a city in Rio Grande do Sul, Anselmi et al.[17] followed a sample of 4,423 children for 11 years (from birth, of a total of 5,249) and the prevalence of attention problems and hyperactivity was 19.9%. The ratio between boys and girls with ADHD is to 4:1,[18] and the proportion found in adults is of 1:1.[19]

Methods

A literature search was performed in the PubMed database between 1992 and 2012, using the keywords “adhd”, “alcohol”, “eating disorder”, “suicide”, “trauma”, “abuse”, “crime”, “urgency”, “internet”, “videogame”, “bullying”, “comorbidity”, “substance disorder”, and their combinations. Article selection considered those most relevant, according to the scope of the proposed topic, in a non-systematic way. A total of 35 articles were selected.

Diagnostic evaluation in attention deficit-hyperactivity disorder

ADHD diagnosis is strictly clinical, based on well-defined clinical criteria of classifications such as DSM-IV[1] and the International Classification of Diseases - 10th Edition (ICD-10).[2]

Findings from several studies are quite consistent, suggesting a two-dimensional construct for the symptoms of ADHD in unreported samples.[20,21] Thus, there is evidence supporting the DSM-IV proposal of three types of ADHD: combined, predominantly inattentive, and predominantly hyperactive/impulsive.[1] Moreover, there are several studies suggesting different neuropsychological profiles, neurobiological substrate, patterns of comorbidity, gender distribution, and harm, according to these types of ADHD.[22-25]

At least six of nine symptoms of inattention and/or hyperactivity/impulsivity need to be frequently present in the last six months for the diagnosis, thus satisfying the A criterion. The most common of the subtypes in clinical settings is the combined, representing approximately 50% to 75% of individuals with ADHD that are treated, while the inattentive subtype accounts for 20% to 30%, followed by the hyperactive-impulsive subtype, with less than 15%.[26-28] While the ICD-10[2] mentions a list of symptoms very similar to that of DSM-IV, it recommends a different way to establish diagnosis, demonstrating lack of agreement between the available classifications. Thus, ICD-10 requires a minimum number of symptoms in the three abovementioned dimensions.

There are also other differences regarding the diagnosis by DSM-IV or by ICD-10. Sørensen et al.[29] found that the diagnosis of ADHD according to DSM-IV occurs more often than according to ICD-10, confirming that the differences between diagnostic classifications may be a problem in this disorder and that they deserve attention, as well as issues related to the diagnostic criteria in particular, which have been discussed in detail in several studies.

Data synthesis

Attention deficit-hyperactivity disorder and risk of accidents

The evaluation of patients with ADHD symptoms in emergency situations initially requires the verification of cases treated in emergency departments and medical emergency situations. Thus, a recent study[30] evaluated children and adolescents aged 3 to 17 years who were treated in an emergency department, and found that children who repeatedly suffered trauma-related visits in this type of service had a predisposition to ADHD and could benefit from screening for this disorder in emergency care. Another study[31] showed that the use of long-acting psychostimulants could decrease the number of visits to the emergency department and the costs of such services for patients with ADHD. Compared with their siblings, ADHD patients have a 2.11-fold greater risk of having accidental injuries ($p > 0.05$).[32]

Two literature reviews have shown an increased risk of driving infractions and the benefits of the use of stimulants in the treatment of individuals with ADHD.[33,34] An American study evaluated 355 adolescents and young adults in relation to dangerous driving - fines and accidents – and found that ADHD in childhood increases the risk for problems related to driving, especially those related to the maintenance of hyperactivity/impulsivity symptoms, and comorbidity with conduct disorder. Another study followed specifically hyperactive children into adulthood, and found more problems and fines related to driving when

compared to controls.[35] Thus, there is an evident need for better psychiatric evaluation of patients involved in accidents, not only for ADHD, but also for other disorders (which may be comorbidities) equally related to accidents, such as major depressive disorder and alcohol dependence disorder.[36]

A recent study in Turkey[37] with 475 children aged between 8 and 17 years found a significant association between dental trauma and ADHD ($p = 0.0001$). A review[38] on the subject showed that traumas in playground accidents, as well as falls and collisions during games and sports, are the most common causes of dental trauma in childhood; the study indicated the same strong association with ADHD. Another American study with 161 children[39] demonstrated an association between symptoms of hyperactivity and impulsivity with dental trauma ($p < 0.001$).

Attention deficit-hyperactivity disorder, suicide, and addiction risk

Daviss & Diler[40] also found an association between ADHD and suicide, in a group of adolescents aged 11 to 18 years, but their findings call for special attention to conflicts between parents and the child, trauma victimization, social impairment, and depression, more than for levels of ADHD symptoms.

Two recent studies[41,42] found an association between ADHD and suicide, and one of these studies found an association especially in young men; however, an increased risk of suicide was observed in patients with comorbidities, particularly those with conduct disorder and depression. Another study[43] in patients with substance use disorders (SUDs) found that the presence of ADHD increases the risk of attempted suicide in men. The presence of comorbidities should also be investigated in patients with ADHD, and once a psychiatric disorder is detected, it becomes important to assess the presence of ADHD. A patient with SUDs that comes for evaluation should have his/her history assessed for the presence of ADHD, as studies have shown a high prevalence of ADHD in adult patients with SUDs.[44,45] A longitudinal study[46] found that the presence of conduct disorder in childhood increased the risk for SUDs, bipolar disorder, and smoking as adolescents or young adults. Another study,[47] carried out in Rio Grande do Sul, found that adolescents with ADHD are at increased risk for SUDs, even after adjustment for confounding factors (conduct disorder, ethnicity, religion, and estimated IQ).

Attention deficit-hyperactivity disorder and comorbidity with bipolar disorder

One problem of diagnosis, as well as of treatment, is the comorbid presence of ADHD with bipolar disorder. Singh et al.[48] found a high prevalence of ADHD in patients with bipolar disorder - up to 85%, while the rate of bipolar disorder in patients with ADHD reached 22%. Donfrencesco et al.[49] analyzed children with comorbidity between ADHD and bipolar disorder, and concluded that the identification of clinical characteristics with an increased risk for bipolar disorder could favor diagnosis, prognosis, and treatment. Wingo & Ghaemi[50] found a rate of 40% association of mania and hypomania caused by stimulant use, and found that 25% of the bipolar patients studied had previously received stimulants.

Attention deficit-hyperactivity disorder and violence

Bullying has also shown to be related with ADHD in a study with 10-year-old children,[51] both as perpetrators and victims. Another study[52] found that autistic children with ADHD are at increased risk for bullying at school.

The association between ADHD and criminal behavior was assessed by Vreugdenhil et al.,[53] who found that 8% of young offenders were diagnosed with ADHD, while a study of adolescent offenders found that 10.6% of subjects had this diagnosis, using the DSM-IV criteria in a clinical interview.[54] Satterfield et al.[55] found an increased risk of criminal behavior in adulthood in boys with hyperactive subtype ADHD and conduct disorder comorbidity.

Attention deficit-hyperactivity disorder and Internet and video games addiction

Internet addiction and its comorbidity with ADHD was assessed by Ha et al.[56] and by Yen et al.[57] Among the numerous comorbidities, it appears that ADHD is the most prevalent in children and adolescents, probably due to impulsivity.[58] Chan & Rabinowitz[59] found a significant association between playing video games for more than 1 hour a day and inattention ($p < 0.001$) and ADHD ($p = 0.018$ and 0.020) at the Conners' Parent Rating Scale (CPRS). Yoo et al.[60] found significant associations between levels of ADHD symptoms and severity of Internet addiction, showing that 22.5% of the students diagnosed in the study with Internet addiction had ADHD (*vs.* 8.1% of non-addicts).

Attention deficit-hyperactivity disorder and sexual abuse

The risk of sexual abuse was also evaluated; Çengel-Kultur et al.[61] found that 22.2% of children and adolescents who were victims of abuse had been diagnosed with ADHD (it was the most common diagnosis). Briscoe-Smith and Hinshaw[62] found high rates of abuse in girls with ADHD (14.3%) compared with the control sample (4.5%). Another study[63] showed that emotional abuse and neglect are more common among men and women with ADHD (compared to controls), as well as that sexual abuse and physical neglect are more commonly reported by women with ADHD. This study showed a significant correlation between childhood abuse, depression, and anxiety in adulthood, although an ADHD diagnosis was a better predictor of worse psychosocial functioning in adulthood. Sugaya et al.[64] evaluated adults and found that physical abuse in childhood (8% of respondents) was associated with a significant increase in the adjusted odds ratio (AOR = 1.16 to 2.28) for mental disorders, especially ADHD, post-traumatic stress disorder, and bipolar disorder.

Attention deficit-hyperactivity disorder and eating disorders

In relation to eating disorders, Mattos et al.[65] studied a sample of Brazilian girls, finding a high number of patients with ADHD and eating disorders, especially binge-eating disorder. Biederman et al.[66] found that girls with ADHD have a 3.6-fold higher risk of having criteria for an eating disorder than controls. In addition, girls with eating disorders had higher rates of major depression, anxiety disorders, and disruptive behavior disorders than girls with ADHD without eating disorders.

Discussion

The findings of this review reinforce the need for identification of ADHD symptoms and the recognition of this disorder as possibly associated with risk factors that are relevant in clinical practice. Leslie et al.[67] showed the importance of protocols for an improved treatment of ADHD patients in accordance with better understanding of the disorder, and Abikoff et al.[68] found that emergency situations need fast and direct interventions, and that a manual as the one proposed by the study "Multimodal Treatment of Children with ADHD-MTA" – ASAP manual – could be applied in these situations.

Another study, by Thapar & Thapar,[69] verified that many doctors working in primary care lacked confidence to manage ADHD, and that most of them had received little or no training in child psychiatry.

A review[70] showed that pediatricians are in a privileged position for early detection of ADHD in children and adolescents, and even for the initial management of some less severe cases. Professional training of primary health care providers for an accurate diagnosis of ADHD or for referral of a patient with possible ADHD symptoms is essential.

Lopez Seco et al.[71] sought to identify, in a clinical sample, factors associated with worse prognosis in patients with ADHD, and found a greater association with comorbidities, a higher percentage of patients without medication, and presence of other risk factors, such as inadequacy of parental structure, adverse social and family environments, and psychosocial stress. The present findings corroborate the findings of that study, showing that ADHD may be associated with risk situations, and reinforce the need to identify factors associated with these risks, whether they are comorbidities more commonly associated with ADHD and risks or other factors associated with poor prognosis, for appropriate treatment of these situations.

Conclusions

This review showed various risk situations and comorbidities that are more often associated with ADHD regarding emergencies, and reinforces the importance of their identification for a more adequate treatment of this disorder.

Conflicts of interest

Marcelo C. Reinhardt received financial support when traveling to attend conferences and symposia from Shire, Janssen, and Novartis; he has also been a lecturer for Janssen and Novartis (considering the last five years).

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