Thematic Article

The Profile of Children Diagnosed with ADHD in Bihor County. Descriptive Data

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Abstract

Although the topic of the profile of children with Attention Deficit Hyperactive Disorder (ADHD) is important for those involved in therapy or teaching, we found very few studies focusing on Romanian populations, and those targeting the North-Western region (Bihor County) are even fewer. ADHD is the most common childhood disorder (Aman et al., 1998), and it is important not only to know and understand the symptoms, but also to pay attention to the cultural specificity of the ADHD diagnosis, if it is possible. We conducted a documentary analysis, aiming to identify the profile of children diagnosed with ADHD in Bihor County and in this regard, we analyzed 196 files registered at the Municipal Hospital from Oradea in 2015. We focused on the demographic data, the symptoms, the comorbid disorders, the treatments, the school environment and type. Our findings confirmed that boys diagnosed with ADHD are more numerous than girls, and we also found significant differences between children depending on their ADHD core symptoms.

Keywords: ADHD; descriptive data; gender differences

Introduction

It is known that achieving an adequate level of impulse control is „one of the most important developmental tasks during childhood and adolescence" (Rauch et al., 2012, as cited in Drugaș 2016:54). Impulse control, among the various cognitive and personality traits, plays a central role when it comes to predict important school achievement or life outcomes in general. The problem appears when students cannot control themselves because they suffer from different disorders. One of these disorders is the Attention Deficit/Hyperactivity Disorder (ADHD).

The American Psychiatric Association (2000) defined Attention Deficit/Hyperactivity Disorder (ADHD) as a persistent and elevated level of inattention and/or hyperactivity-impulsivity. Considering this definition, the core symptoms of ADHD are inattention, hyperactivity, and impulsivity. These symptoms contribute to impairment in a variety of areas, such as social and emotional functioning (Hoza et al., 2005) or academic achievement (Frazier et al., 2007).

A survey conducted by the UK's National Attention Deficit Disorder Information and Support Services, ADDISS, London (2006) showed that short-term school exclusions were identified for 39% of the cases of children with ADHD, and permanent school exclusions were identified in 11% of the cases. 80% of children with ADHD received no help from social services, and 19% had been in trouble with the police. For 92% of them, school achievement was affected; for 83% of them the ability to make friends was affected, and for 84% of them the ability to keep friends was affected.

The main objective of our research was to identify a general profile of children diagnosed with ADHD in Bihor county and to check for connections with the general descriptions provided by the literature in the field. Previous studies showed that boys are more frequent diagnosed with ADHD than girls (Rucklidge, 2008), that

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there are gender differences considering their symptoms (boys are more hyperactive comparing with girls) (Levy et al., 2005; Rucklidge, 2008), or that their school acquisitions (DuPaul et al., 2006). We analyzed demographic data of children with ADHD (age, gender, ethnicity, environment), data about the diagnosis (IQ, EEG, ADHD symptoms, comorbid disorders, treatments), data about school environment and type.

Attention deficit/hyperactivity disorder – a short definition

Barkley (1997) defined ADHD as „a pervasive neurodevelopmental disorder characterized by developmentally inappropriate levels of inattention and hyperactivity/impulsivity". Some examples of early signs of possible ADHD, easily observed in school environment, were offered by Fewell and Deutscher (2002, as cited in Drugaș, 2016, p.55), namely: „acting before thinking, changing activities frequently, having a short attention span, failing to focus and to follow directions, easily distracted, and having difficulty staying on the task". The student's difficulties with sustained attention, impulse control, or staying seated, often generate academic problems, social skills deficits, and peer and adult conflicts, leading to behavior and emotional problems (Ohan et al., 2008).

Rowland et al. (2002) revealed that the estimation of ADHD prevalence is sensitive because the literature reviews report very different prevalence estimates (between 1.7%-17.8% and 4%-12%). The most used prevalence of ADHD is the one established by the Diagnostic and Statistical Manuals (DSM), ranging between 3-5% among school age children, but this estimation is based on the United State population.

Elder (2010, as cited in Hawthorne, 2013) compared the ADHD rate among the youngest and oldest students within the same grade and showed that younger students have an ADHD diagnosis rate 28% to 60%, higher than that of their older classmates. The correctness of the diagnostic rate is debatable, considering that a large number of variables is involved.

As such, Hawthorne (2013) considered that the initial causes of ADHD and the mechanisms that sustain it are not yet understood. The author summarized the following clinical hypotheses: dopamine transmission is slower in ADHD; the norepinephrine or other neurotransmitters may not have a correct function; a variation or delay in brain development is primary in ADHD; ADHD is potentially triggered by environmental variables, such as maternal smoking during pregnancy, pesticides, television viewing or lead exposure.

However, a large part of the ADHD literature is based on clinical samples of children, and these samples often have the advantage of extensive evaluation, but the disadvantage of not representing most children in the community; in other words, most of the clinical-based samples tend to show more psychiatric symptoms and more impairment (Rowland et al., 2002).

Gender differences and similarities in ADHD

Most of what is known about ADHD is based on studies using samples of boys, Rucklidge (2008) showing that girls were less diagnosed with ADHD. Even if the diagnosed girls manifested similar deficits and outcomes as the boys did, Rydell (2010) identified that boys had a significant higher number of ADHD symptoms than girls. These are some of the reasons why Skogli et al. (2013) concluded that ADHD was diagnosed more often in males than in females.

Rucklidge (2008) sustained that girls with ADHD presented the same levels of ADHD as boys, even if small gender differences were registered for adolescent girls with ADHD who had lower self-efficiency and poor coping strategies, compared to boys with ADHD. Considering the social functioning of children and adolescents diagnosed with ADHD, Rucklidge (2008) identified that boys were more aggressive with their peers than girls. In contrast, girls with ADHD were identified to have more emotional problems (lower self-esteem, a negative attributional style, or hopelessness), compared to boys.

DuPaul et al. (2006) investigated a number of 133 boys and 42 girls with ADHD, elementary school students, focusing on the gender differences in academic, social, emotional and behavioral functioning. The researchers used teacher ratings, direct observations of classroom behaviors and a standardized, norm-referenced achievement test. Teachers reported that participants showed academic underachievement. The research findings established that 38% children also met the criteria for comorbid oppositional defiant disorder, and other 15% of participants presented significant conduct disorder symptoms. 29.1% of participants were receiving part-time special education services, and 28.5% were receiving psychotropic medication. However, the results of a series of multivariate analyses of variance revealed no significant gender differences in academic functioning of children with ADHD. The differences appeared for behavior assessment, individual t tests revealing that girls with ADHD were rated significantly higher on the externalizing problems, in comparison

with boys with ADHD. Another conclusion emphasized that both girls and boys with ADHD were found to be functioning in low average in math and reading.

DuPaul's educational paradigm on ADHD emphasizes that students with ADHD are at higher than average risk for grade repetition, placement in special education classroom, and dropping out of high school. Longitudinal studies showed that the academic difficulties for children with ADHD begin early, starting with preschool age, when children with ADHD or symptoms with ADHD are often behind in basic academic readiness skills (DuPaul et al., 2001).

DuPaul's educational paradigm indicates that children with ADHD have significant difficulties in developing positive relations with peers, teachers or school personnel. Often, classmates perceive children with ADHD as annoying, immature, intrusive, verbally and physically aggressive, impulsive and bossy; they are less preferred for friendships, less pleasing and often are among those rejected.

Hyperactivity and aggressiveness in ADHD

Children with ADHD are „highly sensitive to the environmental stimulations, their behavior being quickly disturbed" (Drugaș, 2016:55). They have a poor capacity of self-regulation when they are bored or frustrated, when they must resist to different impulses or when they must reorganize their responses as a result of confrontation with new situations (Douglas, 1988, as cited in Crone et al., 2003). They fail to be persistent when they are involved in a task and find it difficult to accept the postponement of a reward. McGee et al. (1991, as cited in Daley & Birchwool, 2010) found that adolescents who were hyperactive as preschoolers (ADHD under observation) presented poorer reading ability comparing to their peer controls. The authors considered that a hyperactive childhood could predict adolescents' behavioral problems, academic problems which tend to culminate with leaving school with no qualifications.

Students with ADHD may not consistently follow the rules, they are likely to interrupt the conversation, to respond before the question is finished, to enter into an ongoing peer activity, or to behave in a verbally of physically aggressive manner. That is why it is important for public education, public health, clinical practice, and public policy to establish the nature, severity, and persistence of the main features that occur in children with ADHD. During childhood, the self-regulation ability is not well developed, so the child responses in various situations are impulsive. S/He often requires not only the teachers' attention, but the entire school staff's, because s/he has poor self-control (s/he is impulsive, verbally and physically), s/he is hyperactive (an ongoing running and moving) and unable to maintain her/his attention even in a brief conversation. To alleviate these symptoms, it is necessary to employ an intervention designed by the mental health professionals.

Pelham et al. (1990) showed that inattention not only affected school activity, but also had negative effects on the relations with peers, who often feel uncomfortable in the presence of peers with ADHD, because they are impulsive, inattentive, intrusive, pretentious leaders, aggressive and disruptive. The difficulties in time management and planning problems lead to inefficiency in carrying out the daily activities, and this may cause conflicts with parents and teachers. A key issue highlighted by Abikoff et al. (2013) was that even if some children with ADHD developed their skills of organization, planning and time management, they did not know how to put them into practice.

Executive functions involve the ability to plan, to organize information and to use it in problem-solving processes (Semrud-Clikeman et al, 2008). The executive functions include the ability of self-monitoring the behavioral changes. It is often considered that students with ADHD make some errors on purpose. In reality, children with ADHD make the same mistakes (endlessly) because they are not learning from their past experiences.

Chang et al. (2009) explained how children with ADHD fail to foresee the consequences of errors appeared in almost all daily activities. The self-monitoring of behavior is a critical component of the self-regulation process and it is effective especially when the intervention target behaviors or results are valuable for the subject. It was suggested that psychological interventions in ADHD could develop the behavior self-monitoring of children with ADHD in order to decrease the frequency of disruptive and aggressive behaviors (Hoff & DuPaul, 1998). In a more recent study, Harris et al. (2005) showed that the behavior and the ability in self-monitoring improved performance in simple cognitive tasks in the case of children with ADHD who were on medication, even in the absence of an externally applied reinforcements.

Comorbid disorders and medication in ADHD

A frequent comorbid disorder in ADHD is the conduct disorder; between 25% and 45% of children and adolescents with ADHD also present this type of disorder (NRC on ADHD, 2004). Conduct disorder is defined as a persistent and repetitive pattern of those behaviors in which the basic rights of others, the social norms or rules are violated (DSM-IV TR, 2003). Among the diagnostic criteria for the conduct disorder, the manual points out the aggression towards people and animals [often threatens or intimidates others; is physically cruel to other people; threatens the victim (for example: banditry, theft of purses, extortion, assault with an armed hand)]; the property destruction [deliberately destroys others' property (other than by fire)]; the fraud or theft breaks into the house, other buildings or someone's car]; the serious violation of the rules [frequently absent from home at night before the age of 13 years, despite the parents ban]. The antisocial behavior is predictive for school and social problems (Hinshaw et al., 1992). Children with ADHD have a high risk to develop antisocial behaviors, the authors presenting an impressive overview of studies that have shown the presence of high rates of delinquency and substance use in adolescents and young people with ADHD.

Levy et al. (2005) investigated the data from 4,371 Australian twins and siblings diagnosed with ADHD, and the results revealed that boys presented a higher rate of oppositional defiant disorder and conduct disorder. Girls diagnosed with ADHD (the predominant inattention subtype) had less frequent externalizing disorders comparing with boys, but were also more often diagnosed with separation anxiety disorder.

The evolution and prognosis of ADHD can be positive (1) if those who are diagnosed with this disorder do not show the existence of a major comorbid disorder (for example: autism, conduct disorder, severe emotional disorders etc.); (2) if there is a positive adherence to treatment (children/adolescents with ADHD show improvement in dysfunctional areas if they are taking the prescribed medication); (3) if the learning disorders or emotional problems, as comorbid disorders of ADHD, are early diagnosed and all the measures to treat them are investigated and appropriately addressed (Barkley, 2006). Harris et al. (2005) showed that the behavior and the ability in self-monitoring improved performance in simple cognitive tasks in the case of children with ADHD who were on medication, even in the absence of an externally applied reinforcement.

The clinical evidences strongly support the use of stimulant medications for treating the core symptoms of children with ADHD and, to a lesser degree, for improving functioning. Physicians consider that behavior therapy alone has limited effect on symptoms or functioning of children with ADHD, although combining behavior therapy with medication could decrease the amount of (stimulant) medication needed (Brown et al., 2005). However, medication and behavior therapies should be completed with parents' counseling and teachers' training (Fewell & Deutscher, 2002).

The physicians' research outlined that the stimulant medication improved the neuronal substrate responsible with the behavioral inhibition and the executive function dependent on this (Miranda et al., 2002). Jones (2002) outlined that there is a growing trend in using medication, and prescribing Ritalin (the most well-known medication for ADHD) increased 500% in the 2000's comparing with the 1990's. Hawthorne (2013) presented that between 1991 and 2000, in the United States, roughly 90% of ADHD diagnosed persons received a prescription for a stimulant medication. This type of medication increased the attention performance, learning and memory outcomes, and reduced impulsivity in children with ADHD; that was the way in almost 80% of cases where the prescribed medication was based on psychostimulants (Daly et al., 2007).

Psychostimulants activate the central nervous system, and they can be issued only on prescription. The medication's efficiency is evident in various areas of development: the behavior during the activities, the relationships with peers, interactions with parents etc. (Jones, 2002). In managing children with ADHD pharmacotherapy prescribed stimulants, antidepressants, bupropion and alpha-adrenergic medication (Brown & La Rosa, 2002). The stimulant medication was the most frequently prescribed in the treatment of ADHD and the most extensively studied. Pelham et al. (2002) presented a series of studies carried out in laboratories, in which children with ADHD who received medication based on methylphenidate had been shown to be happier in those days, compared with those days when the placebo medication was administered. The methylphenidate increased the compliance, reduced the physical and verbal aggression of boys with ADHD, but there were no differences between groups in terms of prosocial behavior manifestation. The results obtained by authors emphasized that while medication can generate beneficial effects, it did not ensure itself the positive development of social skills.

In October 2020, a search in the ProQuest database with the key words ADHD in Romania returned 0 articles. Continuing to search in other databases (Scopus and SpringerLink) we found very few studies investigating the profile of children diagnosed with ADHD focusing on Romanian populations, and those

targeting the North-Western region (Bihor County) were even fewer. Most of the articles published in these databases were the results of participations to different conferences or symposiums, and a high rate of the studies were dedicated to the topic of ADHD in adulthood. So, demographic data of children with ADHD should be looked into clinical samples, selected after diagnosis, and not from general population samples.

A series of reasons support the necessity of studying the profile of children with ADHD in Bihor county. First of all, knowing the core symptoms of ADHD, the demographical and educational particularities of children with ADHD, will provide important information to teachers, psychologists, physicians and even psychiatrists. Because the nature of ADHD is controversial, and the sociologists emphasize that ADHD is a social construct (Clinard & Meier, 2014; Rafalovich, 2008; Wedge, 2015), the necessity of studying the profile of children diagnosed with ADHD is indubitable.

Research design and Methods

Objective

Considering these findings, the present research aimed to investigate the profile of children diagnosed with ADHD in Bihor county, and to check if this profile corresponds with the demographic date presented by the literature in the field of ADHD. We collected different type of data (demographic data, symptoms, and school environment and acquisition, registered by the psychiatrists when the diagnosis of ADHD was established for children. We focused our data analysis on the gender differences and similarities in ADHD, on the specificity of hyperactivity and aggressiveness in boys diagnosed with ADHD.

Research questions and variables

Three categories of variables were investigated for our participants: (1) demographic data (age, gender, ethnicity, environment); (2) data about the diagnosis (IQ, EEG, ADHD symptoms, comorbid disorders, treatments), and (3) school environment and type.

Considering these variables, we aimed to identify the real profile of children diagnosed with ADHD in Bihor County, and we established seven operational questions, namely:

1. Are there significant differences regarding the core symptoms of ADHD between boys and girls diagnosed in Bihor county?
2. Are the comorbid disorders of children diagnosed with ADHD influenced by the subjects' gender?
3. Are there significant differences regarding children who manifest aggressiveness or the predominantly hyperactive/impulsive ADHD type considering the EEG results?
4. Is the prescription of the medication treatment influenced by the presence of comorbid disorders of children diagnosed with ADHD?
5. Is the presence of the lacunar knowledge level influenced by the intelligence level of children with ADHD?

Our study was based on an empirical research; the data was collected through the content analysis of 196 files of children diagnosed with ADHD in Bihor county from 2008 until 2015. These children were diagnosed by three different psychiatrists, employees of The Municipal Hospital Oradea, Romania. The average age of children was 10.6, with a minimum of 2 years and a maximum of 18 years old. The diagnosis of preschoolers, aged between 2 and 6 years old, was described as "hyperactivity syndrome, ADHD under observation". We identified the age of children with ADHD from Bihor county, their ethnicity, where they lived, and whether boys or girls were diagnosed more often with this disorder. We analyzed the frequencies of categorical variables and to establish if there were significant differences between the frequencies of categorical variables, we used the chi-square tests ($\chi 2$) of homogeneity and of independence. For significant differences, we analyzed the standardized adjusted residuals to establish the direction of the differences.

Results

This chapter is to share all the relevant data and analysis. Please spot those, that connect most profoundly to the questions of your research. Use wisely the attention and time of the reader: tables and graphs are more efficient to cover the results than longer sections of text. Please make sure that the explanation is not simply a repetition of what is shown: your text must give an additional value to your tables and graphs.

The ADHD cases form the present research were diagnosed by the psychiatrists who worked at The Municipal Hospital from Oradea. From the 196 medical records, 69% were diagnosed by psychiatrist #1, 12%

were diagnosed by psychiatrist #2, and 19% of cases were diagnosed by psychiatrist #3. There were differences between these three groups of cases ($\chi 2 = 112.7$, $p < .00$), the group size for psychiatrist #1 was significantly larger comparing with the groups diagnosed by psychiatrists #2 and #3. For the beginning, we aimed to identify some demographic data of the participants. Most of the children diagnosed with this disorder were males (78%), and they were living in urban area (54%). Also, most of them have Romanian ethnicity (71%). Table 1 presents the condensed view of demographic data for our sample.

Table 1. The demographic data of children diagnosed with ADHD in Bihor county

Variables	Modalities	N	%
gender	male	152	78
	female	44	22
ethnicity	Romanian	139	71
	Hungarian	40	20
	Gipsy	17	9
area	urban	106	54
	rural	90	46

There was a significant difference between girls and boys in being diagnosed with ADHD ($\chi 2 = 59.51$, $p < .00$), boys being more often diagnosed with this disorder.

There were three ethnicities identified for children with ADHD in Bihor county, and these were Romanian, Hungarian and Gypsy. There were significant differences between children with ADHD considering their ethnicity ($\chi 2 = 128.643$, $p < .00$). In Bihor county, the Romanian children had a higher score comparing with the Hungarian (20%) or Gypsy children (9%). We identified that most of the children were diagnosed with ADHD (72%) between the ages of 7 and 12. 20% were diagnosed within the ages of 2 and 6, and 8% within the ages of 13 and 18.

Considering the data about the diagnosis, we collected information about the core symptoms core of ADHD that were manifested (inattention, hyperactivity, and impulsivity), if the children with ADHD had an encephalogram examination, or which were the comorbid disorders and their treatments. Table 2 presents the condensed view of data about the diagnosis for our sample.

Table 2. The data about the diagnosis of ADHD symptoms at children in Bihor county

Variables	Modalities	N	%
ADHD core symptoms	has not ADHD core symptoms	54	28
	one ADHD core symptom	88	45
	two ADHD core symptom	50	25
	three ADHD symptom	4	2
EEG exam	unmodified EEG	59	30
	modified EEG	33	17
	without EEG	62	32
	missing values	42	21
comorbid disorders	conduct disorder	50	25
	emotional disorder	31	16
prescribed treatments	ADHD specific medication	110	56
	other type of medication	44	23
	behavioral therapy	16	8
	naturist therapy	10	5
	*missing values	16	8

In our analysis, one of the first important observation was that not all the children had at least one ADHD core symptom registered in their medical file (28%), even if the diagnosis was established. For our questions, we selected only those 142 cases which registered the core symptoms of ADHD.

1. Are there significant differences regarding the core symptoms of ADHD between boys and girls diagnosed in Bihor county?

We identified the distribution of the core symptom for all 142 cases which registered at least one of these core symptoms. Seven combination of the ADHD core symptoms were established, and their distribution for boys and girls is presented in Table 3.

Table 3. Distribution of ADHD core symptoms at boys and girls in Bihor county

	ADHD core symptoms	N	Boys		Girls	
			N	%	N	%
the predominantly hyperactive/impulsive ADHD type	hyperactive	51	39	*76*	12	*24*
	impulsive	25	17	*81*	8	*19*
	hyperactive + impulsive	27	26	*96*	1	*4*
the predominantly inattention ADHD type	attention deficit	12	7	*58*	5	*42*
ADHD without further specification	hyperactive + attention deficit	20	14	*70*	6	*30*
	hyperactive + impulsive + attention deficit	4	3	*75*	1	*25*
	attention deficit + impulsive	3	3	*100*	0	*0*
		142	109		33	

The value of the chi-square test showed no evidence of significant differences between boys and girls with ADHD, considering their core symptoms [$\chi 2(6) = 10.566$; $p = .103$]. Having the 7 categories based on the core symptoms registered in the medical files (see Table 3), we categorized them into the ADHD types provided by the Diagnostic and Statistical Manual of Mental Disorders: attention deficit / hyperactivity disorder, predominantly inattention type (code 314.00), attention deficit / hyperactivity disorder, predominantly

hyperactivity / impulsivity type (code 314.01), and attention deficit / hyperactivity disorder without further specification (code 314.9).

"Hyperactive" appeared in 36% of the cases (N = 51), followed by the combination between the "hyperactive + impulsive" symptoms (19%, N = 27) and the "impulsive" symptom (15%, N = 25). In conclusion, 73% of cases had the predominantly hyperactivity / impulsivity type, followed by the combined type (19%), and the predominantly inattention type (8%).

We aimed to check for differences between boys and girls, considering the core symptoms of ADHD. Applying the chi-square for homogeneity in the case of the predominantly hyperactive/impulsive type, we identified that there were significant differences between boys and girls, [$\chi2 = 36.126$; $p < .00$]. Boys developed more often hyperactivity and/or impulsivity compared with girls. Conducting an analysis of the ADHD core symptoms distribution, we observed that the combination "hyperactivity +impulsivity" was met at only one girl, meaning that this symptom formula was strongly representative for boys. For the other ADHD types, which represent the predominantly inattention type or ADHD without further specification, the number of cases was too small for a statistical analysis of the differences between boys and girls.

In our analysis on the comorbid disorders, we identified that ADHD was associated in some cases with "the emotional disorder" and "the conduct disorder". From a total of 196 cases, a quarter of the children with ADHD also presented "the conduct disorder", and for 16% of cases "the emotional disorder" was the associated diagnosis.

2. Are the comorbid disorders of children diagnosed with ADHD influenced by the subjects' gender?

We identified the distribution of the comorbid disorders for all 196 cases considering the gender of the subjects. The chi-square test for independence did not reveal significant differences between boys and girls considering the association of ADHD with "the conduct disorder" [$\chi2(1) = 0.093$; $p = .761$] and also considering the association of ADHD with "the emotional disorder" [$\chi2(1) = 0.917$; $p = .338$]. In a detailed analysis we identified that from a total of 78 cases diagnosed with "the conduct disorder", 54% did not present "aggressiveness" as a symptom. Aggressiveness is the core symptom for the conduct disorder and considering this we conducted a detailed analysis where we found that boys diagnosed with ADHD in Bihor county were more aggressive, compared to girls diagnosed with ADHD [$\chi2 = 40.205$; $p < .00$]. Even if there were no differences between the comorbid disorder considering the gender of our cases, we still identified that boys (N = 67) were more often aggressive compared to girls (N = 11).

3. Are there significant differences regarding children who manifest aggressiveness or the predominantly hyperactive/impulsive ADHD type considering the EEG results?

Considering the neurological evaluation registered in our cases, we analyzed the presence of the encephalogram (EEG) test. The EEG is registered by the psychiatrists to observe if there is some modification in the neuro-cerebral activity. In our analysis we collected data from the medical files completed by three different psychiatrists, and one of these psychiatrists did not even ask the EEG examination for one from its cases. For the variable "EEG results", we identified three categories: modified EEG, unmodified EEG, and without EEG examination. For 30% of the cases, the EEG was registered as being unmodified, 17% had modification in their EEG, and for 32% of cases this neurological examination was not provided. For 42 files (21%) we did not have access at the results.

We identified the frequency of "aggressive" as a symptom registered into the medical files for 40% of the children diagnosed with ADHD. For all of these cases which had the aggressive symptom besides the ADHD core symptoms, we identified that there were no significant differences between those who had a modified EEG and those with unmodified EEG [$\chi2 = 4.276$; $p = .118$]. Analyzing the cases of children who presented the predominantly hyperactive/impulsive type of ADHD, we also did not find differences [$\chi2 = 2.256$; $p = .324$] between the variable categories (modified EEG, unmodified EEG, without EEG).

Making a closer analysis of those 33 cases which had a modified EEG, we identified that most of them were boys (N = 24), and mostly not associated with the conduct disorder (N = 28), or the emotional disorder (N = 30). We also identified that in those cases which presented modified EEG, 24 (72%) were diagnosed with the predominantly hyperactive/impulsive ADHD type, and a similar number (N = 26) received medication as a treatment for ADHD.

4. Is the prescription of the medication treatment influenced by the presence of comorbid disorders of children diagnosed with ADHD?

Analyzing the prescribed treatments for all 196 cases, we identified that 79% of cases (N = 154) had a prescribed medication treatment (ADHD specific medication or other types of medication), and only 26% had a prescription of alternative treatments (behavioral therapy). We also identified the prescription of other type of medication, even the naturist therapy as a prescribed treatment.

We analyzed two categorical variables, namely "comorbid disorder" and "treatment based on medication". The comorbid disorders variable was divided into conduct disorder and emotional disorder. The prescribed medication treatment included Concerta, Stratera, Timolin, Medikinet). There were significant differences among the cases without conduct disorder and received medication treatment and those who had conduct disorder [$\chi2 = 35.558$; $p < .00$]. Analyzing the emotional disorder as a comorbid disorder for ADHD, we also identified significant differences between children without emotional disorder and medication comparing with those who have emotional disorder and medication [$\chi2 = 75.740$; $p < .00$]. The medication was significantly more often prescribed for cases diagnosed without emotional disorder.

Table 4. ADHD comorbid disorders considering the treatment based on medication

				treatment based on medication	**Total**
comorbid disorders	conduct disorder	not associated with ADHD	observed	114	154
			expected	77	
		associated with ADHD	observed	40	
			expected	77	
	emotional disorder	not associated with ADHD	observed	131	154

Table 4 presents the data on prescribing medication in those cases which also had comorbid disorders. The prescription of the medication was not influenced by the presence of the emotional or conduct disorder.

For a detailed analysis we wanted to identify which were the most frequent symptoms for those cases which receive medication, establishing in this way the main criteria for prescribing medicine. The medication should be prescribed for the severe form of ADHD and considering this we wanted to identify how many ADHD core symptoms presented those cases which received treatment based on medication? From a total of 154 cases which had medication prescribed as treatment, we identified the following categories: 64 cases which had one ADHD core symptom, 42 cases which had two core symptom, and 45 cases which did not have any ADHD core symptoms. We found significant differences between these categories [$\chi2 = 51.039$; $p < .00$]. Most of those cases which had one symptom of ADHD received medication as a treatment for ADHD. Considering this, we identified that most the frequent symptom in these cases was the hyperactive behavior. 78% from those cases which were diagnosed with the predominantly hyperactive/impulsive type of ADHD received medication. In conclusion, the medication as treatment for ADHD is given to those children who manifested hyperactivity and/or impulsivity. We identified that those cases which also manifested aggressiveness (N = 60) did not have prescription of medication as often as those cases which did not (N = 94). Significantly more cases without aggressiveness received medication compared to those which presented aggressiveness as a symptom [$\chi2 = 7.506$; $p ;< .00$]. In conclusion, the main criteria in prescribing medicine treatment was the presence of hyperactivity and/or impulsivity as symptoms, and not the aggressivity, conduct disorder or emotional disorder as associated diagnostics of ADHD.

5. Is the presence of the lacunar knowledge level influenced by the intelligence level of children with ADHD?

Having most of the cases in school age, we analyzed the data connected with school environment and type. Table 5 includes data about level of knowledge (information provided by the psychological evaluation made by the hospital psychologist), the IQ levels, and data about the school type and environment, recorded in the medica files after the psychological evaluation and the psychiatric interview.

Table 5. The data about the educational background of children with ADHD in Bihor county

Variables	Modalities	N	%
level of knowledge	satisfactory knowledge	53	27
	lacunar knowledge	130	66
	*missing values	13	7
IQ	between 38 and 69 (extremely low)	57	29
	between 70 and 89 (very low and low average)	95	49
	between 90 and 119 (average and high average)	31	16
	missing value	13	6
school type	mainstream school	126	64
	mainstream school with adapted curriculum	21	11
	special school	17	9
	unschooled	6	3
	*missing values	26	13
school environment	urban area	89	46
	rural area	73	37
	*missing values	34	17

Table 5 presents that most of the children diagnosed with ADHD (66%) had lacunar knowledge, and they were learning in mainstream schools (64%). „Lacunar knowledge" means that the school acquisitions were under the level of criteria asked by the curricula. Even so, only 11% of children with ADHD (N = 21) followed an adapted curriculum in their mainstream schools. Regarding the intelligence level, we had data for 87% from the total cases, and we identified that more than a half of these cases (65%) did not have mental deficiency, registering scores between a low average and high average level of intelligence. The mean of IQ values was 77 (minimum 38, maximum 117).

We emphasize that Zahirnic and his collaborators (1974) established that the average IQ level of the Romanian children was 94, and it was established by the through the Colored Progressive Matrices. From our data, the mean of IQ values for children with ADHD in Bihor county was 77 (minimum 38, maximum 117). Considering the intelligence levels established by the psychological tests used by the psychiatrists validated on the Romanian population, we categorized the IQ values into three level of intelligence: between 38 and 69 - extremely low intelligence level, between 70 and 89 - very low and low average intelligence level, between 90 and 119 - average and high average intelligence level. Considering this, most of our cases (65%) do not have mental deficiency, registering values between low average and high average intelligence levels. The descriptive data of the mean of IQ value showed that the mean IQ values for boys was 77.23 [minimum 38, maximum 117], and for girls 77.63 [minimum 54, maximum 104]. Applying the chi-square test for homogeneity, we identified that there were significant differences between children who present different level of intelligence, considering the lacunar level of knowledge [$\chi 2 = 23.048$; $p < .00$].

Table 6. The distribution of the lacunar knowledge level considering the intelligence level of children with ADHD

Intelligence levels	Observed	Expected
extremely low	37	41.3
very low and low average	65	41.3
average and high average	22	41.3
Total	124	

Many cases which presented lacunar knowledge level were defined by a low average of intelligence (N = 65). These data sustain DuPaul's educational paradigm on ADHD who considered that children with ADHD or symptoms with ADHD were often behind in basic academic skills (DuPaul et al., 2001). To establish which were the symptoms associated with the lacunar knowledge level of children diagnosed with ADHD, we analyzed the particularities of these cases.

Our data revealed that only 8 cases with lacunar knowledge level were diagnosed with learning difficulties, and only 28 were registered as disturbing the class. Table 7 shows the distribution of different symptoms for the 124 cases which presented a lacunar knowledge level.

Table 7. The distribution of different symptoms at children diagnosed with ADHD who present lacunar knowledge level

Symptoms	Observed	Expected	Chi-square	p
hyperactive behavior	72	65	1.508	.219
low tolerance frustration	61	65	.492	.483
aggressive	47	65	9.969	.00
impulsive	41	65	17.723	.00
emotional issues	35	65	27.692	.00
disturbing the class	28	65	42.123	.00
attention deficit	26	65	48.800	.00
opposer	21	65	59.569	.00
learning difficulties	8	65	99.969	.00

We observed that the number of children with hyperactive behavior was not significant different in comparison to those without hyperactive behavior. The situation was the same for low frustration tolerance. For our cases, the lacunar knowledge level often appeared at children with ADHD who had low and average intelligence level, but was not often met in those children who presented learning difficulties, disturbing the class, attention deficit, aggressive or impulsive behavior.

Discussion and conclusions

Our research aimed to provide information about the profile of children diagnosed with ADHD in Bihor county. We found significantly more boys diagnosed with ADHD than girls, sustaining Rucklidge's (2008) conclusions that girls were less diagnosed with ADHD. It was interesting to identify the type of symptoms manifested by boys with ADHD, as opposed to girls. We identified that boys developed more often hyperactivity and/or impulsivity as opposed to girls, but we could not identify if the girls presented more often the predominantly inattention type or ADHD, because the number of cases was too small for a statistical analysis of the differences.

Rucklidge (2008) also emphasized that girls with ADHD have emotional problems. We did not find significant differences between boys and girls considering the association of ADHD with "the emotional disorder". What we identified was that boys diagnosed with ADHD in Bihor county were more aggressive, compared with girls diagnosed with ADHD. We identified that the frequency of "aggressiveness" as a symptom was registered into the medical files for 40% of the children diagnosed with ADHD.

The clinical evidences strongly supported the use of stimulant medications for treating the core symptoms of children with ADHD, especially for the externalized symptoms (such as hyperactivity and impulsivity). A surprising finding from our data emphasized that from a total of 154 cases which had medication prescribed as treatment, almost 30 % of children diagnosed with ADHD did not have any ADHD core symptom (but still the medication was prescribed). The research in the field emphasized that stimulant medication improves the neuronal substrate responsible with the behavioral inhibition and the executive function dependent on this (Miranda et al., 2002).

Another interesting finding in our research, connected with the medication treatment, was that the medication was significantly more often prescribed for cases diagnosed without conduct disorder or emotional disorder, compared to the cases of children with comorbid disorders. The prescription of the medication was not necessarily associated with the core symptoms or with the comorbid disorders. These findings should provide future topics for our research, for a closer examination of the symptoms which require medical prescriptions.

The management of emotional experiences represents „an important determinant of functional social skills of children" (Jones, 2002 as cited in Drugaș, 2016, p. 56). The socio-cognitive researches show the importance of self-attributions for an adaptive or maladaptive functioning of children with ADHD (Johnston & Leung, 2001). To explain this theory, the authors provided examples of using the medication in treating ADHD. There are concerns that in using this type of therapy, the success could inappropriately be attributed to medication, and not to the rehabilitation strength of children with ADHD. If the attributional style is associated with external factors (for example "the therapist is most important, without him I cannot handle", "the medication is that one who is helping me" etc.), this may lead to learned helplessness.

In another topic, DuPaul et al. (2006) emphasized that there are no significant gender differences in academic functioning of children with ADHD. Considering this variable, we identified that more than half of the children diagnosed with ADHD (66%) had lacunar knowledge, and they were learning in mainstream schools. We did not find differences between boys and girls considering their IQ or knowledge levels.

All our findings encourage us to develop further analyses on the profile of children diagnosed with ADHD in Bihor county. We will analyze more closely the symptoms network of children with ADHD, because even if the diagnosis is established, there are cases in our database without any ADHD symptoms. Also, we will focus on the social representations of ADHD developed in our local community, and we will check if these influence the diagnosis procedure provided by the specialists.

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