

Attention Deficit Hyperactivity Symptoms in Children with Autistic Disorder: A Cross-Sectional Descriptive Study

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Objective: (1) to examine the co-occurrence of attention deficit and hyperactivity symptoms in children with autistic disorder, and (2) to study the correlation between attention deficit hyperactivity symptoms and the severity of autistic disorder.

Material and Method: This was a clinical based study. The authors used Childhood Autistic Rating scale (CARs) to evaluate the severity of autistic disorder. Swanson, Nolan, and Pelham Teacher and Parent Rating Scale, Version IV (SNAP-IV) was used to measure attention deficit and hyperactive symptoms in children with autism.

Results: Thirty ($n = 30$) children enrolled in this study. All participants displayed attention deficit symptoms and 18 participants demonstrated hyperactivity as well. Nonparametric correlation showed a high positive correlation ($Spa = 0.90, p = 0.00$) between the severity of autistic disorder and hyperactivity and not the attention deficit symptoms ($Spa = 0.29, p = 0.16$).

Conclusion: The authors finding shows a high comorbid rate of attention deficit and hyperactive symptoms among the participants.

Keywords: Attention deficit, Hyperactivity, Comorbid, Autistic

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Autism is a brain development disorder hallmarked by impaired social interaction and communication and by restricted and repetitive behavior. All of these signs begin before a child is three years old. Verbal and nonverbal communication skills, such as speech and facial expressions, develop peculiarly.

Another symptom of autism is extreme resistance to change of any kind. Autistic children tend to want to maintain established behavior patterns and a set environment. They develop rituals in play, oppose change (such as moving furniture), and may become obsessed with one particular topic. Other behavioral abnormalities that may be present are staring at hands, flapping arms and hands, walking on tiptoe, rocking, tantrums, strange postures, unpredictable behavior, and hyperactivity⁽¹⁾.

Attention-deficit/hyperactivity disorder (AD/HD or ADHD) is a neurobehavioral developmental disorder. It is the most commonly diagnosed psychiatric

disorder in children, affecting about 3-5% of children globally with symptoms starting before seven years of age. It is characterized by a persistent pattern of impulsiveness and inattention, with or without a component of hyperactivity⁽¹⁾.

There are three different types of ADHD: inattentive, hyperactive-impulsive, and combined. Diagnosis is determined by which symptoms are strongest in the individual with ADHD.

Attention abnormalities and hyperactive behavior have been suggested to occur in some children with pervasive developmental disorder (PDD)⁽²⁾. In fact, it has been theorized that impairments in attention and arousal may underlie some of the primary neuropathological functioning of individuals with autism^(3,4).

Attention problems affect the autistic child's ability to accurately perceive, understand and respond in a meaningful way to environmental and social stimuli. Various studies have linked the attention difficulties present in many individuals with autism spectrum disorders (ASD) to the specificity, complexity, or motivational features of the stimuli⁽⁵⁾.

The primary objective of this research is to examine the co-occurrence of attention deficit and

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hyperactivity symptoms in children with autistic disorder. The secondary objective is to examine the correlation between the severity of autistic disorder and ADHD symptoms.

Material and Method

The Ethics Committee of the Faculty of Medicine, Chiang Mai University, approved this research (Certificate of Approval no.006/2551). This is a cross-sectional study focusing on children and adolescent under 18 years who have autistic disorder.

Population

All patients were diagnosed as having autistic disorder by a child and adolescent psychiatrist using DSM-IV-TR criteria. Patients who had medical illness or who took medication that can cause attention deficit and hyperactivity symptoms were excluded.

Instruments

The SNAP-IV Rating Scale is a revision of the Swanson, Nolan and Pelham (SNAP) Questionnaire (Swanson et al, 1983). The items from the DSM-IV (1994) criteria for Attention-Deficit/Hyperactivity Disorder (ADHD) are included for the two subsets of symptoms: inattention and hyperactivity/impulsivity. Severity of autistic disorder was measured by the Childhood Autism Rating scale (CARS). Although CARS was developed before the publication of the DSM IV, studies have shown that CARS is nevertheless an effective screening device for autism^(6,7).

All subjects whose parents signed a consent form were evaluated for attention deficit hyperactivity symptoms using the SNAP-IV Teacher and Parent Rating Scale and the Childhood Autism Rating Scale (CARS). The cut-off point score for SNAP-IV in ADHD-IN and ADHD-H/IM items were 2.5 and 1.78. Subject who had CARS 37 and above were categorized as having severe autistic symptoms.

The sample size was calculate by using

$$\text{Sample size} = \frac{sn}{(1+sn/N)} \text{ and } sn = \frac{z^2pq}{(d^2)}$$

p = prevalence = 0.7

q = 1-p

d = error acceptable = 0.05

N = Available population = 30

z = 1.96 (Type 1 error of 5%)

(N = the average number of children with autistic disorder who came to hospital in a year)

Thus, the sample size should be greater than 27.

Statistical analysis

The co-occurrence was calculated in percent. Mean $\pm$ standard deviation (SD) were used to report subjects characteristics. The correlation between severity of autistic disorder and ADHD symptoms were calculated using Spearman's rho Correlation Coefficient. A p-value of ≥ 0.05 was for statistically significant.

Results

Thirty children and adolescents with autistic disorder participated in this research. The average age was 12.6 ± 4.2 . CARS ranged from 24.0-45.0 with a mean of 35.02 (SD = 5.97). The other characteristics are shown in Table 1.

All subjects had a SNAP-IV score in ADHD-IN above the cut-off point. Eighteen subjects (60%) had ADHD-H/IM scores above the cut-off point.

According to CARS and SNAP-IV, the severity of autistic disorder correlated with hyperactivity with impulsivity symptoms ($\rho = 0.897$, $p = 0.00$). The severity of autistic disorder had no correlation with hyperactivity with inattention symptoms ($\rho = 0.263$, $p = 0.16$).

Discussion

The authors results showed a high comorbid rate of attention deficit and hyperactive symptoms among children with autistic disorder. These findings support the findings of Holtmann M et al⁽⁸⁾, Goldstein S⁽⁹⁾ and Le Cavalier L⁽¹⁰⁾ that attention abnormalities and hyperactive behavior occur common in children with pervasive developmental disorder. In addition, Sturm et al⁽¹¹⁾ determined that 95% of the children in their sample exhibited attention problems. Likewise, the authors found that there is a positive correlation between hyperactivity and impulsivity symptoms with severity of the autistic disorder.

Thus, issues of co-morbidity (co-occurring diagnoses), phenotypes (subgroups of individuals

Table 1. Characteristic of subjects

Characteristic	n	Percentage
Male	23	76.70
Female	7	23.30
CARS		
Severe (CARS ≥ 37)	14	46.67
Not severe (CARS < 37)	16	53.33

CARS = childhood autism rating scale

Table 2. Correlation between CARS, ADHD-IN and ADHD-H/I

Referents	Statistic value	CARs	ADHD-IN	ADHD H/IM
CARS	Spearman's rho	1.000	-0.263	0.897**
	p2 tails		0.160	0.000
	n	30	30	30
ADHD-IN	Spearman's rho	-0.263	1.000	-0.361*
	p2 tails	0.160		0.050
	n	30	30	30
ADHD-H/IM	Spearman's rho	0.897**	-0.361*	1.000
	p2 tails	0.000	0.050	
	n	30	30	30

** Correlation is significant at the.01 level (two-tailed)

* Correlation is significant at the.05 level (two-tailed)

CARS = childhood autism rating scale

ADHD-IN = attention deficit hyperactivity disorder: inattention

ADHD-H/IM = attention deficit hyperactivity disorder: hyperactivity-impusivity

within a disorder) and profiles (levels of functioning across domains of ability within or between disorders) in these heterogeneous disorders demand further exploration. These results support the findings of Smalley SL⁽¹²⁾ that there is a genetic linkage between attention-deficit/hyperactivity disorder and autism. (Variations in a gene on 16p13 may contribute to common deficits found in both ADHD and autism).

When considering diagnoses of ASD and ADHD, the possibility of co-morbidity remains a plausible but tentative option for many clinicians. Although the current DSM IV-TR diagnostic manual identifies short attention span, impulsivity and hyperactive behavior as part of the associated features of autism, a diagnosis of ADHD cannot be provided "if the symptoms of inattention and hyperactivity occur exclusively during the course of a pervasive developmental disorder⁽¹⁾". However, recognizing the presence of ADHD with autism is critical because of the impact of the problems associated with these disorders⁽¹³⁾. Attention problems affect the autistic child's ability to accurately perceive, understand and respond in a meaningful way to environmental and social stimuli. Since such symptoms are prevalent among children with autism, it is crucial that appropriate diagnostic hypotheses be made when considering treatment plans among children with PDD who exhibit ADHD symptoms. This ensures that such individuals will not be at risk for greater dysfunction.

Our limitation is small sample size. This research was funded by Autistic Foundation, Faculty of Medicine, Chiang Mai University.

Potential conflicts of interest

None.

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อาการสมาธิสั้นในเด็กที่ป่วยด้วยโรคออทิสติก: การศึกษาภาคตัดขวางเชิงพรรณนา

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วัตถุประสงค์: เพื่อศึกษาการมีอาการสมาธิสั้นและอาการชวนร่วมในผู้ป่วยออทิสซึม และความสัมพันธ์ระหว่างอาการสมาธิสั้น และอาการชวนกับความรุนแรงของอาการออทิสซึม

วัสดุและวิธีการ: เป็นการศึกษาภาคตัดขวางเชิงพรรณนา (cross sectional) แบบ clinical based study ในผู้ป่วยเด็กออทิสซึม ซึ่งได้รับการรักษาแบบผู้ป่วยนอกและผู้ป่วยในของโรงพยาบาลมหาวิทยาลัยเชียงใหม่โดยใช้ Childhood Autism Rating scale (CARs) ประเมินความรุนแรงของออทิสซึม และใช้ Swanson, Nolan and Pelham Questionnaire-IV Teacher and Parent Rating Scale (SNAP-IV) ประเมินอาการสมาธิสั้น

ผลการศึกษา: มีผู้ป่วยเด็กออทิสซึม จำนวน 30 คน เข้าร่วมในการศึกษา ผู้ป่วยทุกรายมีภาวะ ADHD-inattention type ร่วมด้วย แต่อาการ ADHD-Hyperactivity/Impulsivity จะพบผู้ป่วยออทิสซึมระดับรุนแรงเท่านั้น และจากการวิเคราะห์ความสัมพันธ์ระหว่างระดับความรุนแรงของภาวะออทิสซึมและภาวะสมาธิสั้นโดยใช้ Nonparametric Correlation, ค่า Spearman's rho พบว่า Childhood Autism Rating Scale มีความสัมพันธ์ในเชิงบวกกับ ADHD-Hyperactivity/Impulsivity อย่างมีนัยสำคัญทางสถิติ ($Spa. = 0.90, p = 0.00$) แต่ไม่มีความสัมพันธ์กับ ADHD-inattention type ($Spa. = -0.26, p = 0.16$)

สรุป: มีความชุกของอาการสมาธิสั้นสูงในผู้ป่วยออทิสซึม และมีความสัมพันธ์ระหว่างอาการสมาธิสั้นชนิดที่มีอาการชวน (ADHD-Hyperactivity/Impulsivity) กับระดับความรุนแรงของอาการออทิสซึมในเชิงบวกอย่างมีนัยสำคัญทางสถิติ
