

ADHD Symptoms in Adults with Asperger's Disorder: Findings from a Sample in Japan

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Rec date: May 29, 2014, Acc date: July 01, 2014, Pub date: July 07, 2014

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Abstract

Introduction: DSM-IV and ICD-10 criteria do not allow co-diagnosis of Pervasive Developmental Disorders (PDD) and Attention-Deficit/Hyperactivity Disorder (ADHD), but some researchers have noted that persons with PDD including Asperger's disorder (AS) sometimes have symptoms similar to those of ADHD. The present study evaluated ADHD symptoms in adults with AS using Conner's Adult ADHD Rating Scales screening version (CAARS-S:SV) in a Japanese sample.

Methods: The present study evaluated ADHD symptoms in 40 adults with AS and 38 normal adults using CAARS-S:SV, Autism-Spectrum Quotient (AQ), Schizotypal Personality Questionnaire (SPQ), and Eysenck Personality Questionnaire (EPQ). The AS and the normal control group did not differ significantly in age, sex ratio, or estimated IQ.

Results: Total, Inattention/Memory, and Hyperactivity/Restlessness scores of CAARS-S:SV were significantly higher in persons with AS than those in controls. In persons with AS, there was no significant correlation among three CAARS-S: SV scores and AQ.

Discussion: These findings indicated that adults with AS have considerable ADHD symptoms, as well as in childhood and adolescence reported in previous reports. The results that in persons with AS total score of AQ was not correlated with CAARS scores indicated that ASD and ADHD have different pathophysiology.

Keywords: Asperger's disorder; PDD; ADHD; CAARS; AQ

Introduction

According to the criteria of the DSM-IV [1] and ICD-10 [2], Asperger's disorder (AS) is a neurodevelopmental disorder and a subtype of Pervasive Developmental Disorders (PDD) or Autism Spectrum Disorder (ASD). AS is defined as a disorder in which the individuals meet the criteria for autism but have no history of delay in cognitive or language development. Persons with AS sometimes show repetitive maladaptive behaviors stereotyped motor mannerisms, and rigid adherence to routines, in addition to difficulty in interpersonal relationships [3]. Other clinical features of persons with AS include problems organizing themselves in their environments, understanding other people's feelings, and sympathizing with others. Kanai et al. [4] reported high scores on the Schizotypal Personality Questionnaire (SPQ) and on the Neuroticism and Psychoticism scores of the Eysenck Personality Questionnaire (EPQ) in adults with AS.

Previous studies have indicated that persons with Autism spectrum disorders (ASD) have high rates of comorbidity with other mental disorders, especially with mood disorders and anxiety disorders [5,6]. Subjects with ASD are often apt to be misdiagnosed as having other mental disorders. The difficulty of diagnosis may be partly explained by the fact that pediatricians and psychiatrists do not fully understand the concept of ASD, especially in adult cases.

Although DSM-IV and ICD-10 criteria do not allow co-diagnosis of ASD and Attention-Deficit/Hyperactivity Disorder (ADHD), some researchers have noted that persons with ASD sometimes have symptoms similar to those of ADHD [7]. Inattentive and hyperactive symptoms are common in adults with ASD, however, only a few studies evaluated ADHD symptoms in adult subjects with ASD [8,9]. In the present study, we evaluated ADHD symptoms in adults with AS using the Conner's Adult ADHD Rating Scales self-report screening version [10]. In addition, we evaluated the relationships between ADHD symptoms and characteristics of personalities in persons with AS using SPQ and EPQ.

Methods

Subjects and procedure

Subjects provided written informed consent prior to completing the questionnaires in the study, which was approved by the ethics committee of the Faculty of Medicine of Showa University. The clinical group of this study comprised 40 outpatients at Showa University Hospital (mean age [SD], 29.4[7.3] years; 28 men and 12 women). Inclusion criteria were age of 18 to 65 years, no current use of psychotropic medications, and formal diagnosis of AS based on the criteria of DSM-IV [1]. Exclusion criteria was a history of electroconvulsive therapy, alcohol or other drug abuse or dependence, or any neurologic illness affecting the central nervous system.

The subjects were required to bring records from elementary school to high school and a maternal and child health handbook. The maternal and child health handbook includes records of pregnancy, childbirth, and the neonatal and infant periods, and are provided by the local government office in Japan. To confirm the diagnosis of subjects being high-functioning, intellectual ability was assessed using the Japanese version of the National Adult Reading Test developed by Nelson and Wilson [11], which is composed of 25 Japanese irregular words as an estimate of pre-morbid or prior ability (JART-25). The JART-25 was used as an equivalent of the IQ test, because JART-25 has IQ prediction validity [12].

A team of four experienced psychiatrists and two clinical psychologists performed the assessment, which consisted of detailed interviews with the subjects about development and behavior from infancy to adolescence. The subjects were also asked to bring suitable acquaintances who knew them in early childhood. At the end of the clinical interview, the subjects were diagnosed by the psychiatrist according to the DSM-IV criteria, based on consensus between the psychiatrist and the clinical psychologist. Approximately three hours were needed to make the diagnosis.

The normal control group comprised 38 adults, who were recruited by e-mail, announcements, and acquaintances through Showa University Hospital and several drug companies (mean age [SD], 30.5 [4.4] years; 29 men and 9 women). The subjects were asked to complete the questionnaires. After all participants who completed the questionnaires were interviewed by the clinical psychologist based on assessment with the Japanese version of the Mini-International Neuropsychiatric Interview (MINI) [13], persons with any mental disorders were excluded from this study. The Japanese version of MINI is a short structured diagnostic interview for the DSM-IV and ICD-10, which has satisfactory reliability and validity [14]. The AS and the normal control group did not differ significantly in age, sex ratio, or estimated IQ (AS: mean, 111.3 [SD 7.7]; controls: mean, 108.5 [SD 8.1]).

Measures

The Autism-Spectrum Quotient (AQ), developed by Baron-Cohen et al. [15], is a 50-item self-administered measure for adults with normal intelligence to assess for the presence of autistic traits. A higher score indicates more autistic traits. Baron-Cohen et al. [15] showed that a cut-off of 32 discriminates between AS/high-functioning autism and normal controls. The Japanese version of the AQ is standardized for use in Japan and is reported to have good internal consistency reliability, test-retest reliability, and discriminant validity [16,17].

Schizotypal Personality Questionnaire (SPQ) developed by Raine [18] is a 74-item self-report measure designed to be useful in screening for schizotypal personality disorder. A higher score indicates higher schizotypal personality traits. The Japanese version of the SPQ, developed by Someya et al. [19], was administered to 258 college students with reported good internal consistency reliability and concurrent validity.

Eysenck Personality Questionnaire (EPQ) developed by Eysenck and Eysenck [20] is a 100-item self-report measure to assess personality traits. The EPQ consists of three personality scores (Psychoticism [P], Extraversion [E], and Neuroticism [N]) and Lie (L) score. Psychoticism (P) is associated with the likelihood of having psychotic behavior such as being unsympathetic and egocentric. Extraversion (E) is characterized by being outgoing, sociable, and uninhibited. Neuroticism (N) is characterized by high levels of negative affect, such as anxiety and depression. The Japanese version of the EPQ, developed by Tsuji et al. [21], was administered to 305 students. The subscales of the EPQ have a reported internal consistency reliability of moderate to high and reasonable factorial validity.

The Conner's Adult ADHD Rating Scales (CAARS) measure the presence and severity of ADHD symptoms. The CAARS was developed by Keith Conner's and it has been designed to help assess, diagnose, and monitor treatment of ADHD in adults [10]. The CAARS forms are available in long, short, and screening versions. Two formats are included for self-report ratings and observer ratings for each version. In the present study, CAARS self-report screening version (CAARS-S:SV) was used. The CAARS screening version has 30 items and contains 2 subscales (Inattention/Memory Problems: IM and Hyperactivity/Restlessness: HR). Total score of CAARS-S:SV is the sum of the scores of IM and HR. A higher score indicates more ADHD traits. The Japanese version of the Conner's Adult ADHD Rating Scales screening version, developed by Takahashi et al. [22], is reported to have good internal consistency reliability and concurrent validity.

Statistical Analysis

We compared the scores of the questionnaires between persons with AS and controls using the Student's t-test. We examined the relationships between the scores of the questionnaires using Pearson's product-moment correlation coefficients. We analyzed the data using SPSS version 17.0 (SPSS, Tokyo, Japan).

Results

	A S(n=40)	N C (n=38)	p
A Q	39.0 (5.6)	15.2 (6.5)	P<0.0001
SPQ	34.2 (12.7)	7.7 (7.2)	P<0.0001
N (EPQ)	13.4 (4.9)	5.2 (4.9)	P<0.0001
E (EPQ)	3.5 (2.8)	10.8 (4.8)	P<0.0001
P (EPQ)	8.3 (2.4)	4.9 (2.4)	P<0.0001
IM (C A A R S-S :S V)	14.4 (6.1)	5.8 (4.0)	P<0.0001
H R (C A A R S-S :S V)	8.6 (5.7)	4.8 (4.0)	P<0.01

Total(C A A R S - S :S V)	23.0 (10.8)	10.6 (7.2)	P<0.0001
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Table 1: Mean Scores (SD) of questionnaires of the two groups. **Note:** AQ= Japanese version of Autism – Spectrum Quotient; SPQ= Japanese version of schizotypal Personality Questionnaire; EPQ= Japanese version of Eysenck Personality Questionnaire; P, Psychoticism; E, Extraversion; N, Neuroticism; C A A R S - S :S V= Conner's Adult ADHD Rating scales screening version; IM=In attention/Memory problems; HR=Hyperactivity/Restlessness; AS= Asperger's disorder; NC =normal control; SD =standard deviation

Table 1 shows the scores of questionnaires of the two groups. Total scores of the AQ (p<0.0001), the SPQ (p<0.0001), N score (p<0.0001) and P score (p<0.0001) of the EPQ, and total score (p<0.0001), IM score (p<0.0001), and HR score (p<0.01) of CAARS-S:SV were significantly higher in persons with AS than those in controls. E score of the EPQ were significantly lower in persons with AS than that in controls (p<0.0001).

S:SV. In controls, N score of EPQ was correlated significantly with IM (p<0.01), HR (p<0.01), and total score (p<0.01) of CAARS-S:SV. E score of EPQ was correlated significantly with HR (p<0.01) of CAARS-S:SV. Total score of SPQ was correlated significantly with IM (p<0.01), HR (p<0.01), and total score (p<0.01) of CAARS-S:SV.

Discussion

The present study evaluated ADHD symptoms in adults with AS using CAARS-S:SV. The total, IM, and HR scores of CAARS-S:SV in adults with AS were higher than those in controls. These findings indicated that adults with AS have considerable ADHD symptoms, as well as in childhood and adolescence [5,6].

ASD, which includes AS, is a neurodevelopmental disorder with high rates of comorbidity with other mental disorders [23,24]. Although ASD and other mental disorders are often simultaneously diagnosed, the DSM-IV [1] and the ICD-10 [2] prohibit the diagnosis of ADHD in individuals with an ASD diagnosis. Previous studies indicated that the prevalence of ADHD among individuals with ASD is estimated to be 28.2% [25], particularly among those with HFA/AS its 44% - 65% [26,27]. Giovinazzo et al. [27] investigated psychiatric comorbidity in 86 high-functioning ASD and reported that 25 subjects (37.9%) had ADHD. Holtmann et al. [8] examined 182 PDD subjects and reported that subjects with a severe attention problem exhibited a significantly higher degree of general psychopathology. These results stress the clinical necessity to assess inattention and hyperactivity/impulsivity in persons with ASD. However, there has not been enough research on ADHD symptoms in persons with ASD, especially in adults. The results of the present study indicated that ADHD symptoms is frequently observed and to evaluate ADHD symptoms is necessary for the treatment of adults with ASD.

In persons with AS, total score of AQ were not correlated with CAARS scores. Several researchers have argued the relationships between ASD and ADHD and have concluded that ASD and ADHD have different pathophysiology, although the symptoms of both disorders are overlapping [28]. The result that total score of AQ was not correlated with CAARS scores in the present study suggested autistic and ADHD symptoms have different etiology.

Contrast to the results in controls, in persons with AS, there was almost no significant correlation among three CAARS-S:SV scores and scores of other questionnaires. The results that only P score of EPQ was correlated significantly with IM and total score of CAARS-S:SV suggested that ADHD symptoms in persons with Asperger's disorder were associated with liability to psychosis.

The results of the present study indicated that adults with AS have considerable ADHD symptoms and further studies are needed to examine the relationships between ASD and ADHD.

	AS (n=40)		NC (n=38)	
	Correlation Coefficient	P	Correlation Coefficient	P
AQ/IM (CAARS-S:SV)	-0.099	ns	0.3055	ns
AQ/HR (CAARS-S:SV)	0.155	ns	0.17	ns
AQ/total (CAARS-S:SV)	0.021	ns	0.262	ns
EPQ(N)/IM (CAARS-S:SV)	0.29	ns	0.418	p<0.01
EPQ(N)/HR (CAARS-S:SV)	0.259	ns	0.462	p<0.01
EPQ(N)/total(CAARS-S:SV)	0.302	ns	0.486	p<0.01
EPQ(E)/IM (CAARS-S:SV)	0.224	ns	0.038	ns
EPQ(E) HR (CAARS-S:SV)	0.246	ns	0.42	p<0.01
EPQ(E)/total (CAARS-S:SV)	0.271	ns	0.252	ns
EPQ(P)/IM (CAARS-S:SV)	0.346	p<0.05	0.293	ns
EPQ(P)/HR (CAARS-S:SV)	0.27	ns	0.174	ns
EPQ(P)/total (CAARS-S:SV)	0.339	p<0.05	0.258	ns
SPQ/IM (CAARS-S:SV)	0.239	ns	0.413	p<0.01
SP Q/HR (CAARS-S:SV)	0.221	ns	0.455	p<0.01
SPF/total (CAARS-S:SV)	0.247	ns	0.478	p<0.01

Table 2: Correlation coefficients among scores of self-rating questionnaires. **Note:** AQ: Japanese version of Autism – Spectrum Quotient; SPQ: Japanese version of schizotypal Personality Questionnaire; EPQ: Japanese version of Eysenck Personality Questionnaire; P: Psychoticism; E: Extraversion; N: Neuroticism; C A A R S - S :S V: Conner's Adult ADHD Rating scales screening version; IM: In attention/Memory problems; HR: Hyperactivity/Restlessness; AS: Asperger's disorder; NC: Normal Control; SD: Standard Deviation

Table 2 shows correlation coefficients among the scores of questionnaires of the two groups. In persons with AS, there was almost no significant correlation among three CAARS-S:SV scores and scores of other questionnaires. Only P score of EPQ was correlated significantly with IM (p<0.05), and total score (p<0.05) of CAARS-

Limitations

There are some methodological issues in this study. First, the sample size is relatively small. A more sophisticated statistical analysis should be used if the sample size was large enough. Therefore, we should use a larger sample in a future study. Second, the severity of symptoms was assessed with self-rating questionnaires. Moreover, in the present study, to focus on the ADHD symptoms, we did not examine the relationships between the AQ and the scores of other questionnaires.

To confirm the results of the present study, we should use structured interviews to assess the symptoms of the subjects.

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