Psychometric properties of the Chinese version of the adult ADHD Self-report Scale

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Abstract

Although attention deficit/hyperactivity disorder (ADHD) in adulthood has become a topic of considerable interest to psychiatrists over the past decade, little is known about the prevalence or correlates of adult ADHD in the Chinese population. As a first step in addressing this problem, this study presents data on the psychometric properties of the Chinese version of the World Health Organization's Adult ADHD Self-report Scale (ASRS) in a sample of 1031 young males from an army base and 3298 young adults from two colleges. All participants completed the Chinese ASRS. Participants from an army base also completed a clinical assessment including the Wender Utah Rating Scale (WURS) for assessing childhood ADHD, the Impulsiveness Scale for measuring the severity of current impulsive behaviors, and information about substance use. Results showed good concordance (intraclass correlations = 0.80–0.85) and internal consistency (Cronbach's alpha = 0.83–0.91) among the ASRS subscales and moderate to high correlations between these subscales and the WURS (Pearson's correlations = 0.37–0.66). The Chinese ASRS also demonstrated the ability to predict childhood disruptive problems and habitual use of substances. Our findings suggest that the Chinese ASRS is a reliable and valid instrument to assist in screening for adult ADHD. Copyright © 2008 John Wiley & Sons, Ltd.

Key words: Adult ADHD Self-report Scale, Chinese version, reliability, validity, ADHD

Introduction

Attention deficit/hyperactive disorder (ADHD) is a common neuropsychiatric disorder worldwide among children and adolescents (Biederman and Faraone, 2004) with a prevalence in the range 5–10% in Western countries (Faraone et al., 2003) and 7.5% in Taiwan (Gau et al., 2005). It has been suggested that as high as 60% of children with ADHD, continue to have clinically significant ADHD symptoms at adulthood (Biederman et al., 2000; Rasmussen and Gillberg, 2000). Consistent with this suggestion, a recent national survey of US adults found that 4.4% met criteria for current adult ADHD (Kessler et al., 2006). However,

many adults with ADHD symptoms are often undiagnosed and do not receive treatment, resulting in both high impairment in role functioning (Hechtman, 2000), and substantial family and societal burden (Goldman et al., 1998).

Despite the similar prevalence of adolescent ADHD to that in Western countries (Gau et al., 2005), no comparable data on adult ADHD exist in Taiwan. In order to conduct ADHD studies in Taiwanese adult populations for cross-cultural comparisons, preparation of an internationally recognized instrument for measuring ADHD symptoms in adults should be the first step of research on ADHD.

Among the rating scales for ADHD symptoms at adulthood, we prepared the Chinese version of the most widely used World Health Organization's (WHO's) Adult ADHD Self-report Scale v 1.1 Symptom Checklist (ASRS) for the use in clinical, research, and community settings. The ASRS is a DSM-IV-based measure, which includes 18 questions about frequency of recent DSM-IV Criterion A symptoms of adult ADHD. The ASRS responses were compared to the clinical rating in a sample who reported childhood ADHD and adult persistence in the US National Comorbidity Survey Replication (NCS-R) (Kessler et al., 2005a). The wording of questions in the ASRS, slightly different from the wording in the ADHD Rating Scale, is designed to collect information about ADHD symptoms in the context of adulthood rather than childhood, providing a context for symptoms to which adults can relate. For example, references to 'play' and 'school-work' have been deleted and replaced by 'work' and 'boring or difficult project.' A pilot version of the ASRS has been validated by the clinician-administered ADHD RS-IV in adult patients with ADHD (Adler et al., 2003). Other commonly used scales include the Wender Utah Rating Scale (WURS) (Ward et al., 1993), the Conners' Adult ADHD Rating Scales (CAARS) (Conners et al., 1999), and the Brown Attention Deficit Disorder Scale for Adults (Brown, 1995).

The design of the ASRS fits the clinical assessment of ADHD based on the DSM-IV diagnostic system and it has been translated into several different languages and widely used in internationally epidemiological studies in recent years. However, to the best of our knowledge, no data examining the psychometric properties of a Chinese version of the ASRS have been published in a peer-reviewed journal. In view of this, we carried out the current study to establish the normative data, reliability, and validity of the Chinese versions of the ASRS.

Methods

Participants and procedures

The sample included 1031 young males (mean age $\pm$ standard deviation, SD: 22.7 ± 1.9) from an army base and 3298 first-year college students (mean age $\pm$ SD: 18.0 ± 0.9), 1220 males (37.9%) and 1998 females (62.1%). Respondents were recruited between July 2005 and January 2006. Sixty-nine college students consented to the test-retest reliability study with a two-

week interval. The 1031 participants from an army base were drafted into the army for the compulsory military service with duration less than two years (mean $\pm$ SD: 1.5 ± 1.6). Most of them were unmarried (96.9%) and graduated from senior high school (40.9%) or college (39.8%). Some of them had a history of psychiatric clinic visit (4.3%) or a family history of psychiatric disorders (4.5%).

The Institutional Review Board of National Taiwan University Hospital approved this study prior to the implementation. First-year college students were instructed about the purposes and procedures of the study as well as assurance of confidentiality before administration of the Chinese ASRS. Of the 3940 first-year college students, 83.7% ($n = 3298$) consented to and completed the Chinese ASRS as a classroom exercise.

The subjects from the army base were given the exercise in the form of a self-administered questionnaire for a routine mental health survey in conjunction with a routine physical examination given to all soldiers. After explanation of the purpose of this study as well as assurance of confidentiality for the data included in this study, they all (100%) consented to this study using the data from the Chinese ASRS, WURS, and Impulsiveness Scale; and a set questions about behavioral problems at primary school and current habitual use of substances and suicidal behaviors. Trained research assistants checked the questionnaires immediately after completion to detect any missing data and asked army subjects to fill in missing questionnaire responses.

Measures

The measures included the ASRS, WURS, Impulsiveness Scale and a set of questions about frequent behavioral problems at primary school (inattention in class, difficulty completing homework, hyperactivity and fidget, much more talkative than peers, clinical diagnosis of ADHD, and delinquency) and current (past six months) risky behaviors (habitual use of tobacco, alcohol or illicit drug, and suicidal attempts).

Adult ADHD Self-report Scale (ASRS)

The ASRS is an 18-question scale, developed in conjunction with revision of the WHO Composite International Diagnostic Interview (CIDI) (Kessler and Ustun, 2004). The 18 questions of the ASRS were generated from a pool of questions about the symptoms of ADHD that typically expressed among patients with adult ADHD. The ASRS consists of two subscales,

inattention and hyperactivity-impulsivity, each of them containing nine items. Each item maps onto one of the 18 DSM-IV Criterion A symptoms of ADHD. Each subject is asked how often a symptom occurred over the past six months on a five-point Likert scale with 0 for never, 1 for rarely, 2 for sometimes, 3 for often, and 4 for very often (Kessler et al., 2005a). Individuals with a sum score on either subscale of 24 or greater are considered highly likely to have ADHD. Scores of 17–23 are classified likely and 0–16 unlikely to have ADHD.

The Chinese translation of the ASRS was prepared with culturally-relevant colloquial expressions by the authors. A two-way translation was performed independently by three child psychiatrists and professional bilingual translators in Taiwan; and psychiatrists and researchers from Harvard University. In a group of leading board-certificated child psychiatrists in Taiwan, the linguistic validity and content validity of this scale was performed. The 18-Question ADHD-ASRS Symptom Checklist can be reached at the website: <http://www.hcp.med.harvard.edu/ncs/asrs.php>.

Wender Utah Rating Scale (WURS)

The WURS is a 25-item scale designed to question childhood symptoms of ADHD retrospectively and symptoms in adults as an aid for diagnosis of ADHD in adults (Ward et al., 1993). Items are rated on a five-point Likert scale where 0–4 represent not at all or very slightly, mildly, moderately, quite a bit, and very much. Satisfactory internal consistency and test–retest validity of WURS were demonstrated in several studies (Oncu et al., 2005; Rossini and O'Connor, 1995; Wierzbicki, 2005). Recent studies have found different factor structures: three factors, 'Dysthymia,' 'Oppositional/Defiant Behavior,' and 'School Problems' (McCann et al., 2000); and five factors, 'Irritability,' 'Depression,' 'School Problems,' 'Behavioral Problems/Impulsiveness,' and 'Inattentiveness' (Oncu et al., 2005). The WURS has been translated into Chinese and used in a study on the correlation between the Chinese WURS and Symptom Check List-90-Revised (Chang and Chuang, 2000). Our pilot study has revealed four-factor structure of the Chinese WURS: 'Disobedience,' 'Attention Problems,' 'Low Self-esteem' and 'Academic Problems.'

Impulsiveness Scale

The Impulsiveness Scale, a 30-item scale in Chinese, was developed according to the Barratt's constructs of impulsiveness that consists of three dimensions: motor

impulsiveness (11 items), cognitive impulsiveness (eight items) and non-planning impulsiveness (11 items) (Li et al., 2002). Items are rated as 1 for rarely/never, 2 for occasionally, 3 for often, and 4 for almost always. Factor analysis using a principle axis method and oblimin rotation revealed two factors (Motor Impulsiveness, 19 items, and Non-planning Impulsiveness, 11 items) which explained 38.27% of variance (Berlin et al., 2004). The Impulsivity Scale has been widely used in Taiwan (Li et al., 2002) and was used in this study to validate the Chinese ASRS. In the present study, we replicated the same method for factor analysis of the Impulsiveness Scale and obtained the same factor structure as the original one. The two factors with eigenvalues as 5.93 and 5.08 explained 91.65% of variance.

Statistical analysis

SAS 9.1 (SAS Institute Inc., Cary, NC) was used for the data analysis. Intraclass correlations (ICCs) and its 95% confidence interval (CI) using the Proc Mixed procedure for total scale, and two subscales of the Chinese ASRS were calculated for the test–retest reliability (Muller and Buttner, 1994); and Cronbach's alpha (α) was calculated for the internal consistency. A paired *t*-test was further employed to test the difference of the repeated measures. The concurrent validity of the Chinese ASRS was tested by its Pearson correlations (*r*) with the total scales and subscales from the Chinese WURS and Impulsiveness Scale. Besides, a multiple regression analysis with backward elimination was used to identify the subscales of the WURS and Impulsiveness in the final predicted model significant at the 0.05 level.

Analysis of variance and a linear regression model were used to compare the mean scores of the two subscales of the Chinese ASRS between the subjects presenting with childhood problems (including inattention in class, difficulty completing homework, hyperactivity and fidget, hypertalkativeness, clinical diagnosis of ADHD, and delinquency) and those without as well as between the subjects with risky behaviors (including current suicidal attempts and habitual use of tobacco, alcohol, and illicit drug) and those without.

Results

Test–retest reliability and internal consistency

Table 1 shows that the ICC with its 95% CI for test–retest reliability among the 69 subjects were high

Table 1. Test–retest reliability, internal consistency of the adult ADHD Self-rating Scale

SCALE	Test–retest reliability					Internal consistency	
	ICC (95% CI)	1st	2nd	<i>t</i> Value	<i>p</i> Value	Cronbach α	
		Mean $\pm$ SD	Mean $\pm$ SD				
						Army	College
ASRS (sample size, <i>n</i>)		(n = 69)				(n = 1031)	(n = 3298)
Inattention	0.80 (0.71, 0.86)	14.35 $\pm$ 5.87	14.54 $\pm$ 5.52	0.44	0.663	0.87	0.85
Hyperactivity/Impulsivity	0.82 (0.74, 0.87)	10.48 $\pm$ 5.50	10.23 $\pm$ 5.46	−0.62	0.539	0.85	0.83
Total score	0.85 (0.79, 0.90)	24.83 $\pm$ 10.00	24.77 $\pm$ 9.98	−0.08	0.934	0.91	0.89

ADHD, attention deficit/hyperactivity disorder; ASRS, adult ADHD Self-rating Scale; ICC, intraclass correlation; CI, confidence interval; SD, standard deviation.

Table 2. Concurrent validity of the adult ADHD Self-rating Scale

	Adult ADHD Self-rating Scale					
	Pearson correlation			Final predicted regression model, betas (95% CI)		
	Inattention	Hyperactivity	Total score	Inattention	Hyperactivity	Total score
<i>Wender Utah Rating Scale</i>						
Disobedience	0.49***	0.59***	0.58***	NS	0.14 (0.08, 0.20)***	NS
Attention problems	0.56***	0.57***	0.61***	0.40 (0.28, 0.52)***	0.32 (0.21, 0.43)***	0.82 (0.63, 1.01)***
Low self-esteem	0.55***	0.58***	0.61***	0.17 (0.08, 0.26)***	0.13 (0.05, 0.21)*	0.40 (0.26, 0.54)***
Academic problems	0.43***	0.37***	0.44***	0.19 (0.07, 0.31)*	NS	NS
Total Score	0.59***	0.63***	0.66***	—	—	—
<i>Impulsiveness Scale</i>						
Motor impulsiveness	0.48***	0.53***	0.55***	0.17 (0.13, 0.21)***	0.17 (0.13, 0.21)***	0.38 (0.31, 0.45)***
Non-planning impulsiveness	0.19***	0.15***	0.19***	0.14 (0.09, 0.19)***	0.09 (0.05, 0.13)***	0.26 (0.18, 0.34)***
Total score	0.51***	0.52***	0.56***	—	—	—
R ² for the final model	—	—	—	0.41	0.45	0.50

ADHD, Attention deficit/hyperactivity disorder; betas, regression coefficients; CI, confidence interval; NS, not significant.

p* < 0.01; **p* < 0.0001.

(≥ 0.80) and there was no statistically significant difference between the two measurements of each subscale of the ASRS at a two-week interval. The Cronbach alpha coefficients for internal consistency of each subscale for college (0.83–0.89) and army samples (0.85–0.91) were high (see Table 1).

Concurrent validity

The Pearson correlations (*r*) between the subscales and total score of the Chinese ASRS and the Chinese WURS and Impulsivity Scale were used to demonstrate the concurrent validity of the Chinese ASRS (Table 2). We found that the subscales and total score

of the ASRS were significantly correlated with the WURS and Impulsiveness Scale (all p values < 0.0001). The ASRS were highly correlated with the Disobedience, Attention Problems, and Low Self-esteem subscales of the WURS ($r \geq 0.55$) except moderate correlation between the Inattention subscale of ASRS and Disobedience subscale of the WURS, and between the ASRS and the Academic Problems of the WURS. The subscales of the ASRS were moderately correlated with the Motor Impulsiveness subscales, but low correlated with the Non-planning Impulsiveness subscale of the Impulsiveness Scale.

Using a multiple regression analysis to identify the significant variables among the four subscales of the WURS and two subscales of the Impulsivity Scale to predict the Chinese ASRS (Table 2), we found that all these subscales except the Disobedience subscale predicted the Inattention of the ASRS; all these subscales except the Academic Problem predicted the Hyperactivity/Impulsivity of the ASRS; and the Attention Problem, Low Self-esteem, Motor Impulsiveness, and Non-planning Impulsiveness predicted the total score of the ASRS.

Discriminant validity of the ASRS by childhood behavioral problems

The mean scores of the Inattention and Hyperactivity/Impulsivity subscales of the ASRS were compared between the army participants who reported a particular behavioral problem at primary school or not. Our findings showed that the participants having inattention in class, difficulties finishing homework, hyperactivity and fidgety, hypertalkativeness, delinquent behaviors, and a clinical diagnosis of ADHD by a psychiatrist at primary school scored significantly higher in inattention and hyperactivity/impulsivity of the ASRS currently than their counterparts (Table 3).

Discriminant validity of the ASRS by risky behaviors

Those army participants who have been using tobacco, alcohol, or illicit drug habitually scored significantly higher on the Hyperactivity/Impulsivity subscale of the ASRS than their counterparts; however, they did not score higher on the Inattention subscale of the ASRS (Table 4). Participants who have ever had suicidal attempts had higher scores on both Inattention and

Table 3. Discriminant validity of the ASRS by childhood behavioral problems

Childhood problems		Adult ADHD Self-rating Scale			
		Inattention	Betas (95% CI)	Hyperactivity/ Impulsivity	Betas (95% CI)
		Mean $\pm$ SD		Mean $\pm$ SD	
Inattention in class	Yes ($n = 195$)	17.74 $\pm$ 6.60	4.59 (3.69, 5.49)***	14.87 $\pm$ 6.43	4.40 (3.55, 5.25)***
	No ($n = 836$)	13.15 $\pm$ 5.52		10.47 $\pm$ 5.14	
Difficulty in homework	Yes ($n = 231$)	17.73 $\pm$ 6.10	4.79 (3.96, 5.62)***	14.64 $\pm$ 6.12	4.30 (3.51, 5.09)***
	No ($n = 800$)	12.94 $\pm$ 5.54		10.34 $\pm$ 5.15	
Hyperactivity & fidgety	Yes ($n = 153$)	17.17 $\pm$ 7.02	3.70 (2.69, 4.71)***	15.72 $\pm$ 6.84	5.19 (4.26, 6.12)***
	No ($n = 878$)	13.47 $\pm$ 5.65		10.53 $\pm$ 5.06	
Hypertalkativeness	Yes ($n = 123$)	18.55 $\pm$ 6.84	5.14 (4.05, 6.23)***	16.65 $\pm$ 6.48	6.06 (5.05, 7.07)***
	No ($n = 908$)	13.40 $\pm$ 5.62		10.58 $\pm$ 5.15	
Diagnosis of ADHD	Yes ($n = 25$)	18.20 $\pm$ 9.35	4.27 (1.90, 6.64)**	16.60 $\pm$ 9.11	5.43 (3.20, 7.66)***
	No ($n = 977$)	13.93 $\pm$ 5.87		11.18 $\pm$ 5.50	
Delinquency	Yes ($n = 488$)	14.85 $\pm$ 6.11	1.54 (0.80, 2.28)***	12.29 $\pm$ 6.04	1.88 (1.19, 2.57)***
	No ($n = 516$)	13.31 $\pm$ 5.82		10.41 $\pm$ 5.14	

ADHD, attention deficit/hyperactivity disorder; SD, standard deviation; betas, regression coefficients; CI, confidence interval.

** $p < 0.001$; *** $p < 0.0001$.

Table 4. Discriminant validity of the ASRS by risky behaviors

Current risky behaviors		Adult ADHD Self-rating Scale					
		Inattention	Betas (95% CI)	<i>p</i> Value	Hyperactivity/ Impulsivity	Betas (95% CI)	<i>p</i> Value
		Mean ± SD			Mean ± SD		
Tobacco	Yes (<i>n</i> = 312)	14.47 ± 6.11	0.64 (−0.16, 1.44)	0.117	11.89 ± 6.01	0.83 (0.07, 1.59)	0.032
	No (<i>n</i> = 719)	13.83 ± 5.97			11.06 ± 5.51		
Alcohol	Yes (<i>n</i> = 273)	14.60 ± 6.08	0.79 (−0.04, 1.62)	0.066	12.02 ± 5.91	0.97 (0.18, 1.76)	0.017
	No (<i>n</i> = 758)	13.82 ± 5.98			11.06 ± 5.57		
Illicit drug	Yes (<i>n</i> = 16)	16.94 ± 4.54	2.96 (−0.01, 5.93)	0.051	15.88 ± 6.82	4.64 (1.86, 7.42)	0.001
	No (<i>n</i> = 1015)	13.98 ± 6.03			11.24 ± 5.63		
Suicidal attempts	Yes (<i>n</i> = 26)	17.46 ± 6.52	3.53 (1.20, 5.86)	0.003	14.27 ± 5.74	3.03 (0.83, 5.23)	0.007
	No (<i>n</i> = 1005)	13.94 ± 5.98			11.23 ± 5.26		

ADHD, attention deficit/hyperactivity disorder; SD, standard deviation; betas, regression coefficients; CI, confidence interval.

Hyperactivity/Impulsivity subscales of the ASRS than those who never had suicidal attempts (Table 4).

Discussion

To the best of our knowledge, this is the first study to examine the psychometric properties of the ASRS outside the US. The findings of this study demonstrated satisfactory test–retest reliability, internal consistency, concurrent validity and discriminant validity of the Chinese ASRS. These findings suggest that the Chinese ASRS is a reliable and valid instrument for measuring ADHD symptoms in Taiwanese adults and that it can be used for screening, assisting in diagnosis, and examination of treatment effect or symptom changes over time in this population.

Our findings showed that the Chinese ASRS was stable over time and had high internal consistency both in the army and college samples. The high stability means that evidence of strong change in ASRS scores in clinical studies could safely be interpreted as due to treatment effects rather than to random intertemporal fluctuations in scale scores.

Concerning the concurrent validity, we used a well-known measure (WURS) of adult ADHD to validate

the Chinese ASRS. As the WURS is designed to aid in the retrospective assessment of ADHD and has become a standard approach used by many clinicians and investigators (e.g. McCann et al., 2000; Rosler et al., 2004; Roy-Byrne et al., 1997), the high correlations between the subscales of the Chinese ASRS and WURS strongly suggest that the ASRS has good validity. The validity of the ASRS was further supported by the fact that it distinguished subjects with ADHD-related behavioral problems at childhood from those without.

The finding of association between symptoms of ADHD in adulthood and those in childhood are consistent with that of previous studies, which reported good consistency in ratings on corresponding measures of ADHD-related problems across time frames (childhood/adulthood) (Kessler et al., 2006; Kessler et al., 2005b; Magnusson et al., 2006; Spencer et al., 1998). Similar to previous studies in adults (Young and Gudjonsson, 2005) and children (Muris and Meesters, 2003; Vitacco and Rogers, 2001), our findings demonstrate the relationship between childhood delinquency and adult hyperactivity/impulsivity symptoms. Additionally, our finding of an association between childhood

delinquency and adult inattention symptoms, which has been less studied, is partially supported by a recent study documenting a relationship between inattention symptoms and delinquent behaviors in middle childhood (Pardini et al., 2006).

Both the inattention and hyperactivity/impulsivity scores of the ASRS were highly correlated with the motor impulsiveness but less strongly correlated with non-planning impulsiveness. This differential finding might possibly be due to the greater difficulty recognizing the subtle cognitive deficits associated with non-planning impulsivity as compared to motor impulsivity. It is possible that the accurate detection of non-planning impulsivity requires another approach, such as a neuropsychological test. For example, Young and Gudjonsson (2005) reported that young adults with diagnosis of ADHD can be differentiated from those without ADHD by the impulsivity tests of the Matching Familiar Figures and errors of commission of the Continuous Performance Test. Future study is needed to investigate the correlation between self-reported questionnaire ASRS and neuropsychological (impulsivity) tests.

Like some studies showing that individuals with ADHD are at increased risks for suicidal attempts (James et al., 2004; Kelly et al., 2004; Murphy et al., 2002; Swensen et al., 2002; Willcutt et al., 1999), our findings lend evidence to support the association between ADHD symptoms and suicidal attempts in young adults. Without measuring comorbid conditions, this study cannot determine whether ADHD has any direct or independent effect on the risk of suicidal attempt. Although literature tends to suggest the explanations for an association between suicidal risks and ADHD by comorbid depression (McGough et al., 2005; Willcutt et al., 1999), conduct disorder (Renaud et al., 1999), and substance use (Renaud et al., 1999; Shaffer et al., 1996), there is some evidence showing a possible independent effect from ADHD on the risks for suicidal attempts (Swensen et al., 2002).

The results reported here also provide evidence of meaningful associations of ADHD with the use of the tobacco, alcohol, and illicit drugs. Interestingly, these associations are more strongly related to hyperactivity/impulsivity than inattentiveness, a specification that is consistent with previous research (Ernst et al., 2006). It is not clear that these associations are due to a causal effect of ADHD and, if so, whether it is a direct effect

or one that is mediated by some intervening disorder such as conduct disorder (e.g. Biederman et al., 1997; Flory and Lynam, 2003).

Methodological consideration

The strengths of this study are that it is the first psychometric study of the Chinese ASRS with two large sample sizes and high response rates; and the validation of the Chinese ASRS was performed by using the well-known reliable and valid instrument (WUSR) and reports on childhood symptoms related to typical ADHD symptoms. However, this study is limited by its restricted male sample for the validity study, only reports from subjects without parental report, no psychiatric interview to confirm the ADHD diagnosis, and no validation of subjects' reports on childhood behavioral problems and ADHD diagnosis, and current substance use and suicidal attempts. The important limitation of this study is only including male participants from an army base for the validity study since military service is compulsive only for Taiwanese men, who were randomly assigned to different army bases. Hence, the finding of our study can be only generalized to the young male population in Taiwan. Moreover, as the diagnosis of ADHD in adults relies on an accurate recall of childhood behavior and an accurate account of current behavior, lack of reports from parents and teachers on childhood symptoms (Jensen et al., 1999) and partners' reports on current symptoms is another limitation. However, informant assessment is much more difficult to obtain for adults than for children (Wender et al., 2001) and a recent study suggests that adults can give a true account of their childhood and current symptoms of ADHD (Murphy and Schachar, 2000). Accordingly, the Chinese ASRS, like other language versions, can be used accurately to measure the current symptoms of ADHD in adult population.

Implication

The recent recognition and explosion of interests of adult ADHD have led to the development of measures to aid in the screening and diagnosis of this disorder. Our findings on the internal consistency of the measures examined here suggest that the symptom manifestations of adult ADHD are not culturally different between the Chinese young men in Taiwan and American adults. Our results also suggest that

the Chinese ASRS is a reliable and valid instrument to assess this syndrome that is suitable for use in clinical and research settings.

The ASRS is especially attractive because of its brevity and ease of administration. Because the use of diagnostic interview in a large-scale epidemiological study could be a time- and effort-consuming task, the DSM-IV-based ASRS, with good reliability and validity of the Chinese version, could be a useful tool in screening for ADHD in adults. However, it is important to note that no rating scale alone will provide sufficient evidence to reliably establish the diagnosis of adult ADHD. Clinical interviews of childhood and current symptoms of ADHD, information from several sources, and when possible, objective supporting evidence, are crucial in making diagnosis of adult ADHD.

Regarding the research implication, future validity studies of the Chinese ASRS by clinical diagnosis of ADHD confirmed by psychiatric interview in both male and female adult population in Taiwan are merit to be done. In short, this work has contributed to the preparation of a part of the internationally recognized instruments for future studies on adult ADHD in Taiwan.

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