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ADHD Symptoms Across the Lifespan: A Comparison of Symptoms Captured by the Wender and Barkley Scales and DSM-IV Criteria in a Population-Based Swedish Sample Aged 65 to 80

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Abstract

Objective: The aim was to compare different scales capturing ADHD symptoms for older individuals' self-reports about childhood and current ADHD symptomatology. An additional aim was relating these results to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV) ADHD criteria. **Method:** The 25-item Wender Utah Rating Scale (WURS) administered in a population-based sample of 1,599 individuals aged 65 to 80. Two subsamples each with 30 individuals were randomly drawn based on their Wender Utah Rating Scale (WURS) scores, and studied using the Wender Riktad ADHD Symtom Skala (WRASS), interview assessed Barkley Scales, and DSM-IV ADHD criteria. **Results:** Higher WURS and WRASS scores were related to higher Barkley Childhood and Current Symptoms Scales Scores. Also, reporting more symptoms on these scales was related to meeting DSM-IV criteria for childhood and current ADHD. **Conclusion:** The results support significant persistence of ADHD symptoms when using different scales designed for the capture of childhood and current ADHD symptomatology. Further studies of ADHD in a lifespan perspective are encouraged. (*J. of Att. Dis.* XXXX; XX(X) XX-XX)

Keywords

ADHD, older adult, persistence, lifespan

Introduction

ADHD is currently understood to be a relatively common psychiatric condition, contrary to previous ideas that ADHD would outgrow in adulthood. The prevalence of adult ADHD in the general population is estimated to range between 2% and 6% (Faraone, Biederman, & Mick, 2006; Kessler et al., 2006; Merikangas et al., 2010; Wender, 1995), and is currently assumed to present throughout the lifecycle. In a recent study (Barbaresi et al., 2013), childhood ADHD is described as a chronic health problem with significant risk for mortality, persistence of ADHD, and long-term morbidity in adulthood. The evidence for persistence of ADHD symptoms is, however, still weak, as data are largely lacking especially from older populations. A systematic literature survey of *PubMed* and *PsychLit* up to and including March 2013 revealed only three relevant old age prevalence estimate studies (Guldborg-Kjär, Sehlin, & Johansson, 2013; Kooij et al., 2005; Michielsen et al., 2012).

The study of ADHD in old age offers major methodological challenges in the context of a lifespan developmental perspective, a challenge that ideally requires a prospective

longitudinal design from childhood until old age. Identifying ADHD symptoms in older adults requires a verification of previous ADHD manifestations and that the symptomatology has persisted throughout the lifespan with onset in childhood. In addition, diagnostic criteria for ADHD also require pervasiveness across situations/settings that can be difficult to define for older adults in their 60s, 70s, and above. Increasing evidence for the persistence of ADHD, however, suggests that the impact of the disorder in many cases remains into adulthood (Barbaresi et al., 2013; Bernardi et al., 2011; Biederman et al., 2006; Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011). Considering both the present and future demographic age structure in society, research and health care systems are challenged to direct their awareness to ADHD over the entire lifespan.

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There are recent reports of an increasing number of patients 60 years and older who nowadays suspect that they might have an ADHD history and now demand to be systematically assessed (Brod et al., 2012; da Silva & Louza, 2008; Henry & Jones, 2011; Manor, Rozen, Zemishlani, Weizman, & Zalsman, 2011; Wetzel & Burke, 2008). Increasing evidence that childhood ADHD can persist into adulthood addresses the question whether ADHD also remains into older age groups. In a recent Dutch study (Michielsen et al., 2012), the prevalence of syndromatic ADHD in older adults was found to be 2.8%, demonstrating that ADHD does not fade or disappear. In our own recent study (Guldborg-Kjær et al., 2013), we found a significant persistence of ADHD symptoms from childhood to old age using scales developed by Paul Wender and his coworkers (Wender, 1995).

In the present study, we analyze the concordance and capture of the Wender and Barkley scales for older individuals' self-reports about childhood and current ADHD symptoms. We also relate the capture on these scales to the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; *DSM-IV*; American Psychiatric Association [APA], 1994) criteria for childhood and adult ADHD. We expected that higher scores on the Wender Utah Rating Scale (WURS; retrospective childhood ADHD symptoms) and on Wender Riktad ADHD Symptom Skala (WRASS; Guldborg-Kjær & Johansson, 2009; Guldborg-Kjær et al., 2013) should be related also to higher scores on the Wender and Barkley scales and that a greater proportion of those with higher scores on these scales would meet the *DSM-IV* criteria for childhood and current ADHD.

Method

Study Sample

From our previous study (Guldborg-Kjær & Johansson, 2009) of a population-based sample of 1,599 individuals in the age range 65 to 80 years, we identified all individuals with a total WURS score of 36 or more. Among those 52 individuals, 30 accepted participation in the present follow-up. Another subsample p of 30 individuals among those with a total WURS score less than 36 was drawn randomly for comparisons.

The sample for the present study sample consists of 60 individuals (30 individuals with total WURS score of 36 or more ($m = 44, 23$, range = 36-82) and 30 individuals with total WURS score less than 36 ($m = 11, 47$, range = 0-35). All individuals accepted participation and written informed consent was obtained from all participants. The age range was 66 to 86; mean age 74, 4 ($SD = 5, 2$). For more details about the study sample, see Guldborg-Kjær and Johansson (2009) and Guldborg-Kjær et al. (2013).

Nonparticipation

Reasons for nonparticipation among the 22 individuals (16 males, 6 females) with a WURS score of 36 or more are known for 17 participants; 3 reported compromised health/frailty, 2 were deceased, 1 had moved to another part of Sweden, and 16 (73%) declined without stated reason. Attempts to gather more detailed information about reasons for nonparticipation from these individuals were made several times through telephone calls but without success. In the comparison group with a WURS score less than 36, there were no drop-outs.

Procedure

Approval for the study was obtained from the Regional Ethical Review Board in Lund (Diarie number 194/2004). Participants from our previous studies (Guldborg-Kjær & Johansson, 2009; Guldborg-Kjær et al., 2013) were asked for participation in an in-person follow-up interview. The set of interview is the same as in our previous study (Guldborg-Kjær et al., 2013). An information letter was distributed in which they were instructed to return their reply in a pre-stamped envelope together with a signed form for informed consent if they accepted participation. Two reminders were sent within a 3- to 4-week interval. Reasons for nonparticipation were collected when reported. Next, participants were re-contacted by telephone and scheduled for a follow-up interview at Hässleholm hospital. If they were unable or unwilling to travel, a home-based interview was offered. Semistructured interviews with the forms for the evaluation of adults developed by Russell A. Barkley and Kevin R. Murphy (1998) and *DSM-IV* criteria were conducted in one session lasting between 60 and 90 min. All interviews were conducted by author T.G.-K. Although, the interviewer was not blind to the results on the WURS scale, this potential bias was counterbalanced by the semistructured format of the interview, by the interviewers' expertise in neuropsychology and geropsychology that motivated a willingness to provide accurate information.

Measures

DSM-IV ADHD criteria and subtyping. The current diagnostic criteria for ADHD according to the *DSM-IV* (*Diagnostic and Statistical Manual for Mental Disorders* (4th ed.; text rev.; APA, 2000) were used. For a diagnosis, there are three critical aspects: at least six of nine symptoms for one of the ADHD subtypes, childhood onset of symptoms, and impairment in at least two areas. ADHD can, according to the *DSM-IV*, be divided into three subtypes: predominantly inattentive, predominantly hyperactive-impulsive, and the combined type. For the combined type, a patient must fully meet the criteria for the inattentive and hyperactive-impulsive subtypes.

Furthermore, the symptoms described cannot be episodic, they must persist for 6 months or longer and must affect at least two areas of functioning (school, work, home, social life). Age of onset is also an important adult ADHD diagnostic criterion. Symptoms must date back to age 7 or younger (in *DSM-5* changed to prior to 12 years of age, APA, 2013). If the childhood history is not present, the patient does not meet criteria for a diagnosis. Most of the major rating scales used for screening patients for ADHD are modeled on the criteria in accordance with *DSM-IV*.

Childhood scales. The scales administered for retrospective childhood ADHD symptoms were the WURS and Barkley Childhood Symptoms Scale (CSS–Child Recall) including the diagnostic criteria in *DSM-IV* for ADHD.

- WURS

The results from the WURS version used in our previous study (Guldberg-Kjär & Johansson, 2009) were used in present study as retrospectively self-rated amount childhood ADHD symptoms. The WURS was developed by Wender and collaborators (Ward, Wender, & Reimherr, 1993; Wender, 1995, 2000) to guide clinicians in using retrospective self-reports in diagnosing childhood ADHD in adults. A cut-off score of 36 and more was suggested to distinguish nonpatients from patients with ADHD and depression (Ward et al., 1993). Using a cut-off score of 46 and more, 86% of patients with ADHD, 99% of normal participants, and 81% of depressed participants were found to be correctly classified (Ward et al., 1993). The WURS scale is described in detail in Ward et al. (1993). The 25-item Swedish version used in (Guldberg-Kjär & Johansson, 2009) is still a widely used instrument for identifying ADHD symptoms in the Swedish clinical context. Cronbach's alpha in our sample (Guldberg-Kjär & Johansson, 2009) was 0.92, indicating good internal consistency.

- Barkley form: Childhood Symptoms Scale–Self-report (CSS–Child Recall)

The Barkley Childhood Symptoms Scale (CSS–Child Recall) is described in detail in *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment* (2nd ed.) by Russell A. Barkley (1998). The fact sheet including the scale and interview questions developed by Barkley (Barkley & Murphy, 1998) was used in the present study in interview assessment. This scale contains the 18 items (see Table 1 for items included) from the *DSM-IV* criteria for ADHD with each item answered on a 4-point scale (from 0 to 3; *not at all*, *sometimes*, *often*, and *very often*, respectively). If any symptom of ADHD was rated *often* or more frequently, these ratings indicated meeting the *DSM-IV* criteria for childhood ADHD. Cronbach's alpha in

our sample of CSS–Child Recall was 0.98, indicating good internal consistency.

Late adulthood scales—current situation. To describe the current life situation and potential late adulthood ADHD symptoms, the WRASS and Barkley Current Symptoms Scale (CSS) including the diagnostic criteria in *DSM-IV* for ADHD were administered.

- WRASS

WRASS is a modified and Swedish version of the Targeted Attention Deficit Disorder Scale (Wender, 1995), named “Wender Riktad ADHD Symptom Skala (i.e., WRASS) to capture persisting ADHD symptoms in adulthood. The scale properties of the Targeted Attention Deficit Disorder Scale (TADDS) are described by Paul Wender (1995) in his book *Attention-Deficit Hyperactivity Disorder in Adults*. The TADDS is presently modified and known as The Wender–Reimherr Adult Attention Deficit Disorder Scale (WRAADDS; Reimherr, Hedges, Strong, Marchant, & Williams, 2005). The TADDS was designed to measure severity of the target symptoms of adult ADHD using the Utah Criteria developed by Paul Wender (Wender, 1995). The TADDS measures symptoms in seven categories: attention difficulties, hyperactivity/restlessness, temper, mood instability, disorganization, over-reactivity, and impulsivity. The Swedish version of the TADDS, the WRASS, is largely based on the TADDS. It consists of in total 35 items and rates individual items from 0 to 4 (0 = *not at all or very slightly*, 1 = *mildly*, 2 = *moderately*, 3 = *quite a bit*, 4 = *very much*). The range of total scores is 0 to 140. Like the TADDS, the WRASS scale covers the above seven categories. There are no clear cut-off scores for WRASS, but scores of 70 or more are generally considered as a cut-off level based on Swedish clinical experience. Cronbach's alpha in our sample was 0.97 indicating good internal consistency.

- Barkley form: Current Symptoms Scale–Self-report (CSS)

The Barkley Current Symptoms Scale (CSS) is described in detail in *Attention-Deficit Hyperactivity Disorder: A Handbook for Diagnosis and Treatment* (2nd ed.) by Russell A. Barkley (Barkley, 1998). The fact sheet including the scale and interview questions developed by Barkley (Barkley & Murphy, 1998) was used in the present study in interview assessment. This scale contains the 18 items (see Table 1 for items included) from the *DSM-IV* criteria for ADHD with each item answered on a 4-point scale (from 0 to 3; *not at all*, *sometimes*, *often*, and *very often*, respectively). If any symptom of ADHD was rated *often* or more frequently, these ratings indicated meeting the *DSM-IV* criteria for

Table 1. Barkley Childhood and Current Symptoms Scale and Domains of Problems in Daily Functioning in Childhood and Currently.

Barkley Childhood and Current Symptoms Scale				
Total sum WURS score	0-35, <i>n</i> = 30		36-100, <i>n</i> = 30	
Age, <i>M</i> (\pm <i>SD</i>)	75.5 (4.7)		73.2 (5.5)	
Gender				
• Men 30	36.7%		63.3%	
• Women 30	63.3%		36.7%	
Childhood and Current Symptoms Scale	Childhood (%)	Current (%)	Childhood (%)	Current (%)
1. Failed/fail to give close attention to details or made/make careless mistakes in my work				
• Never or rarely	80.0	70.0	0.0	0.0
• Sometimes	20.0	30.0	13.3	40.0
• Often	0.0	0.0	60.0	53.3
• Very often	0.0	0.0	26.7	6.7
2. Fidgeted/fidget with hands or feet or squirmed/squirm in seat				
• Never or rarely	76.6	86.7	0.0	0.0
• Sometimes	13.3	0.0	20.0	33.3
• Often	10.0	10.0	36.7	30.0
• Very often	0.0	3.3	43.3	36.7
3. Had/has difficulty sustaining my attention in tasks or fun activities				
• Never or rarely	86.7	86.7	0.0	0.0
• Sometimes	13.3	10.0	13.3	43.3
• Often	0.0	3.3	53.3	40.0
• Very often	0.0	0.0	33.3	16.7
4. Left/leave my seat in classroom or in other situations in which seating was/is expected				
• Never or rarely	93.3	93.3	0.0	0.0
• Sometimes	3.3	0.0	50.0	60.0
• Often	3.3	6.7	33.3	36.7
• Very often	0.0	0.0	16.7	3.3
5. Didn't/don't listen when spoken to directly				
• Never or rarely	96.7	93.3	0.0	0.0
• Sometimes	3.3	6.7	46.7	53.3
• Often	0.0	0.0	40.0	36.7
• Very often	0.0	0.0	13.3	10.0
6. Felt/feel restless				
• Never or rarely	83.3	73.3	0.0	0.0
• Sometimes	6.7	20.0	36.7	10.0
• Often	10.0	3.3	20.0	50.0
• Very often	0.0	3.3	43.3	40.0
7. Didn't/don't follow through on instructions and failed/fail to finish work				
• Never or rarely	96.7	93.3	0.0	0.0
• Sometimes	3.3	3.3	36.7	56.7
• Often	0.0	3.3	40.0	36.7
• Very often	0.0	0.0	23.3	6.7
8. Had/have difficulty engaging in leisure activities or doing fun things quietly				
• Never or rarely	90.0	90.0	0.0	0.0
• Sometimes	10.0	6.7	26.7	60.0
• Often	0.0	3.3	53.3	40.0
• Very often	0.0	0.0	20.0	0.0

(continued)

Table 1. (continued)

Childhood and Current Symptoms Scale	Childhood (%)	Current (%)	Childhood (%)	Current (%)
9. Hade/have difficulty organizing tasks and activities				
• Never or rarely	100.0	80.0	0.0	0.0
• Sometimes	0.0	20.0	30.0	46.7
• Often	0.0	0.0	56.7	40.0
• Very often	0.0	0.0	13.3	13.3
10. Felt/feel "on the go" or "driven by a motor"				
• Never or rarely	76.7	86.7	0.0	0.0
• Sometimes	13.3	13.3	23.3	33.3
• Often	10.0	0.0	43.3	40.0
• Very often	0.0	0.0	33.3	26.7
11. Avoided/avoid, disliked/dislike, or was/am reluctant to engage in work that required/requires sustained mental effort				
• Never or rarely	90.0	86.7	0.0	0.0
• Sometimes	6.7	10.0	13.3	13.3
• Often	3.3	3.3	50.0	60.0
• Very often	0.0	0.0	36.7	26.7
12. Talked/talk excessively				
• Never or rarely	96.7	83.3	0.0	0.0
• Sometimes	0.0	10.0	43.3	43.3
• Often	3.3	6.7	36.7	40.0
• Very often	0.0	0.0	20.0	16.7
13. Lost/lose things necessary for tasks or activities				
• Never or rarely	100.0	90.0	6.7	3.3
• Sometimes	0.0	10.0	60.0	50.0
• Often	0.0	0.0	30.0	36.7
• Very often	0.0	0.0	3.3	10.0
14. Blurtd/blurt out answers before questions were/have been completed				
• Never or rarely	90.0	73.3	3.3	0.0
• Sometimes	6.7	26.7	46.7	50.0
• Often	3.3	0.0	36.7	40.0
• Very often	0.0	0.0	13.3	10.0
15. Was/is easily distracted				
• Never or rarely	93.3	83.3	0.0	0.0
• Sometimes	3.3	13.3	23.3	23.3
• Often	3.3	3.3	46.7	53.3
• Very often	0.0	0.0	30.0	23.3
16. Had/has difficulty awaiting turn				
• Never or rarely	86.7	76.7	0.0	0.0
• Sometimes	6.7	16.7	43.3	36.7
• Often	6.7	6.7	40.0	36.7
• Very often	0.0	0.0	16.7	26.7
17. Was/am forgetful in daily activities				
• Never or rarely	93.3	53.3	0.0	0.0
• Sometimes	3.3	36.7	40.0	16.7
• Often	3.3	10.0	40.0	43.3
• Very often	0.0	0.0	20.0	40.0
18. Interrupted/interrupt or intruded/intrude on others				
• Never or rarely	93.3	80.0	3.3	0.0
• Sometimes	6.7	20.0	40.0	46.7
• Often	0.0	0.0	36.7	50.0
• Very often	0.0	0.0	20.0	3.3

(continued)

Table I. (continued)

Barkley domains of problems in daily functioning in childhood and currently		
Total sum WURS score	0-35, <i>n</i> = 30 (%)	36-100, <i>n</i> = 30 (%)
Problems functioning in childhood		
In my home life with my immediate family		
• Never or rarely	80.0	0.0
• Sometimes	20.0	0.0
• Often	0.0	70.0
• Very often	0.0	30.0
In my social interactions with other children		
• Never or rarely	83.3	0.0
• Sometimes	16.7	20.0
• Often	0.0	60.0
• Very often	0.0	20.0
In my activities or dealings in the community		
• Never or rarely	100.0	0.0
• Sometimes	0.0	50.0
• Often	0.0	50.0
• Very often	0.0	0.0
In school		
• Never or rarely	80.0	0.0
• Sometimes	20.0	10.0
• Often	0.0	36.7
• Very often	0.0	53.3
In sports, clubs, or other organizations		
• Never or rarely	96.7	0.0
• Sometimes	3.3	50.0
• Often	0.0	40.0
• Very often	0.0	10.0
In learning to take care of myself		
• Never or rarely	100.0	0.0
• Sometimes	0.0	56.7
• Often	0.0	43.3
• Very often	0.0	0.0
In my play, leisure, or recreational activities		
• Never or rarely	83.3	3.3
• Sometimes	16.7	33.3
• Often	0.0	46.7
• Very often	0.0	16.7
In my handling of my daily chores or other responsibilities		
• Never or rarely	86.7	0.0
• Sometimes	13.3	36.7
• Often	0.0	56.7
• Very often	0.0	6.7
Problems in current functioning		
In my home life with my immediate family		
• Never or rarely	86.7	0.0
• Sometimes	13.3	30.0
• Often	0.0	66.7
• Very often	0.0	3.3
In my work or occupation		
• Never or rarely	86.7	0.0
• Sometimes	13.3	23.3
• Often	0.0	60.0
• Very often	0.0	16.7

(continued)

Table 1. (continued)

In my social interactions with others		
• Never or rarely	90.0	0.0
• Sometimes	10.0	40.0
• Often	0.0	56.7
• Very often	0.0	3.3
In my activities or dealings in the community		
• Never or rarely	100.0	0.0
• Sometimes	0.0	53.3
• Often	0.0	33.3
• Very often	0.0	13.3
In any educational activities		
• Never or rarely	96.7	0.0
• Sometimes	3.3	63.3
• Often	0.0	33.3
• Very often	0.0	3.3
In my dating or marital relationship		
• Never or rarely	86.7	3.3
• Sometimes	10.0	20.0
• Often	3.3	60.0
• Very often	0.0	16.7
In my management of my money		
• Never or rarely	96.7	3.3
• Sometimes	3.3	40.0
• Often	0.0	36.7
• Very often	0.0	20.0
In my driving of a motor vehicle		
• Never or rarely	100.0	16.7
• Sometimes	0.0	56.7
• Often	0.0	23.3
• Very often	0.0	3.3
In my leisure or recreational activities		
• Never or rarely	86.7	0.0
• Sometimes	10.0	43.3
• Often	3.3	50.0
• Very often	0.0	6.7
In my management of my daily responsibilities		
• Never or rarely	83.3	0.0
• Sometimes	16.7	40.0
• Often	0.0	46.7
• Very often	0.0	13.3

Note. WURS = Wender Utah Rating Scale.

childhood ADHD. Cronbach's alpha in our sample of CSS was 0.97, indicating good internal consistency. χ

- Problems in daily functioning in childhood and currently

For the diagnosis of ADHD to be present, there needs to exist both symptoms and impairment related to ADHD. The interview questions in the clinical interview on general day-to-day adaptive functioning (i.e., how the individual is

doing in meeting the demands of daily life) developed by Barkley (Barkley & Murphy, 1998) was used in the present study to show the degree of impairment in childhood and adulthood (shown in Table 1). There are 8 childhood and 10 current domains where participants are asked to answer to what extent ADHD symptoms existing in childhood currently interfere with the ability to function in different areas of daily life with each question answered on a 4-point scale (from 0 to 3; *never or rarely*, *sometimes*, *often*, and *very often*, respectively). Cronbach's alpha in our sample was

0.97 for Problems in daily functioning in childhood questions and 0.97 for Problems in daily functioning currently questions, indicating good internal consistency.

Barkley adult interview

- Past psychiatric history

Explicit diagnostic criteria for other *DSM* diagnoses were used from the Barkley interview and a diagnostic summary (Barkley & Murphy, 1998) in which notes were made systematically (1 = *yes*, 0 = *no*) if participants reported current psychiatric contact, past psychiatric contact, past psychiatric hospitalization, depression, suicidal thoughts, suicide attempts, anxiety, alcohol/drug abuse, obsessive compulsive disorder, antisocial personality, learning disability, bipolar disorder, and oppositional defiant disorder. In addition, specific notes were made whether any psychiatric disorders were present in childhood as shown in Table 2.

Compromised Cognition and Dementia

Medical records of every participant in our sample were also reviewed to identify individuals who might have been assessed for or diagnosed with dementia. No additional measures were used to document that these participants did not have early symptoms of dementia.

Data Analyses

The total score or item scores for each of the nine scales was calculated. Subsequent data analyses were conducted in three steps. First, differences between samples in the scale scores were investigated. Next, we examined potential gender differences in the scale scores. Finally, we examined associations between age, gender, and obtained scale scores using *t*-tests, chi-square, and correlations. All tests were two-tailed with statistical significance set at $p < .05$. The analyses were performed using the SPSS package, version 21.0.

Results

The distribution and outcome from CSS-Child, CSS, and daily problems in life in childhood and currently between those with the WURS score of 36 or more and those lesser are shown in Table 1.

Our further comparisons among scales are described in the following subsections: WURS versus CSS-Child Recall, WRASS versus CSS, WURS versus Childhood *DSM-IV* Criteria and Subtyping, and WRASS versus Current *DSM-IV* Criteria and Subtyping. The Barkley handbook (Barkley, 1998) contains several alternative scoring systems. These include different cut-off scores, symptom counts, and summary scores. The current *DSM* system only calls for symptom counts not summary scores or alternative

cut-off scores as proposed by Barkley. Much of our results section uses Barkley's alternative cut-off scores and summary scores as opposed to symptom count. Reason for using this alternative scoring system is mostly in regard of the age group in our study comparing the meaning and need for more age-appropriate criteria.

- WURS versus CSS-Child Recall

The CSS-Child Recall scale has separate cut-off scores for each subscale and for men and women over 50 years (see Table 3).

Inattention: Among men in our sample, 19 men had a CSS-Child Recall score of 12.1 (cut-off for men > 50 years) or more for Inattention, their mean WURS score being 44.74. For women in our sample, 11 had a CSS-Child Recall score of 8.2 (cut-off for women > 50 years) or more for Inattention, their mean WURS score being 43.36.

Hyperactive-Impulsive: 19 men had a CSS-Child Recall score of 10.7 (cut-off for men > 50 years) or more, their mean WURS score being 43.42. For women in our sample, 12 had a CSS-Child Recall score of 7.4 (cut-off for women > 50 years) or more for Hyperactive-Impulsive, their mean WURS score being 41.75.

Barkley total Childhood ADHD score (Sum of Inattention + Hyperactive-Impulsive): Among those with a WURS score of 36 or more, all 30 (100.0%) individuals surpassed the cut-off for the total ADHD score CSS-Child Recall (cut-off > 50 years for men being 20.9 and for women 13.1). None of the individuals with a WURS score less than 36 surpassed the cut-off score for total ADHD score. The CSS-Child Recall total ADHD sum mean score was 2.43 among those with a WURS score lower than 36 and 33.70 among those who scored 36 and above (see Figure 1). Significant differences in total CSS-Child Recall scores were found between those with WURS scores of 36 and higher and those with scores less than 36 ($t = 24, 40, df = 58, p = .000$). Thus, those who reported more childhood ADHD symptoms on WURS also reported significantly more childhood ADHD symptoms on CSS-Child Recall scale (median = 33.50, $s = 5.86$, range = 23-45). Those who rated less childhood ADHD symptoms on WURS also rated less childhood ADHD symptoms on CSS-Child Recall scale (median = 0.50, $s = 3.86$, range = 0-17). Age of the sample was not associated with scores on the CSS-Child Recall scale.

- WRASS Versus Barkley Current Symptoms Scale (CSS)

Inattention: Among those in our total sample, 29 (18 men and 11 women) individuals had a CSS score of 9.5 (cut-off for > 50 years) or more for Inattention, their mean WRASS score being 72.07.

Table 2. WRASS Related to Barkley Current Symptoms Scale, DSM-IV Adult Diagnostic Criteria and Subtyping of ADHD in Study Sample ($n = 60$).

Age, $M (\pm SD)$	74.37 (5.2)		
Gender			
• Men	30		
• Women	30		
	Number of participants above/below cut-off = n	WRASS $M (\pm SD)$ for above/below cut-off	WRASS Range for above/below cut-off
Barkley Current Symptoms Scales			
Inattention			
Cut-off ($-1.5 SD/7\%$) > 50 years: 9.5	29/31	72.07 (14.3)/17.77 (15.48)	48-97/4-80
Hyper-Impulsive			
Cut-off ($-1.5 SD/7\%$) > 50 years: 9.9	31/29	71.06 (15.6)/15.10 (10.14)	33-97/4-52
Total ADHD score			
Cut-off ($-1.5 SD/7\%$) > 50 years: 18.2	30/30	72.33 (14.1)/15.70 (10.49)	48-97/4-52
DSM-IV adult criteria			
Inattention			
6 DSM-IV criteria met			
Total	16/44	77.94 (14.9)/31.68 (25.81)	48-97/4-82
Hyper-Impulsive			
6 DSM-IV criteria met			
Total	15/45	75.93 (13.9)/33.38 (27.80)	57-97/4-92
ADHD subtyping according to DSM-IV criteria met for			
• ADHD primarily inattentive	7		
• ADHD primarily hyperactive-impulsive	6		
• ADHD combined	9		
Total	22		

Note. WRASS = Wender Riktad ADHD Symptom Skala; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders (4th ed.; American Psychiatric Association, 1994).

Hyperactive-Impulsive: For Hyperactive-Impulsive current symptoms, 31 (20 men and 11 women) individuals had a CSS score of 9.9 (cut-off for > 50 years) or more, their mean WRASS score being 71.06.

Barkley total CSS (sum Current Inattention and Current Hyperactive-Impulsive): Among those in our total sample, 30 individuals (19 men and 11 women) surpassed cut-off score of 18.2 for persons over 50 years for the Barkley Total Current ADHD score, their mean WRASS score being 72.33 (see Figure 2).

Among those with a WRASS score of 70 or more (Swedish clinical cut-off), all 16 ($m = 34.06$, range = 26-42) individuals surpassed cut-off for the total Barkley Current ADHD score (cut-off > 50 years = 18.2). Among individuals with a WRASS score less than 70 ($n = 44$, $m = 12.02$, range = 0-35), interestingly 14 individuals surpassed the cut-off score for total ADHD score. The Barkley CSS Total ADHD score mean score was 12.02 among those with a WRASS score lower than 70 and 34.06 among those who scored 70 and above. Significant differences in total CSS scores were found between those with WRASS scores of 70 and higher and those with scores below 70 ($t = 6.765$, $df = 58$, $p = .000$). Those who reported more current ADHD symptoms on

WRASS also reported significantly more current ADHD symptoms on CSS (median = 33.00, $s = 4.92$, range = 26-42). Those who rated less current ADHD symptoms on WRASS also rated less current ADHD symptoms on CSS (median = 5.00, $s = 12.63$, range = 0-35).

Age was not associated with scores on CSS. The mean score of the CSS, however, differed significantly between all men and women ($t = -2.433$, $df = 58$, $p = .018$), men rated more frequently current ADHD symptoms. Separate analyses at the item level among those with a Current Symptoms Scale score below and above cut-off score revealed no gender differences.

- WURS versus childhood DSM-IV criteria and subtyping

Subtyping into ADHD-subgroups revealed eight individuals being considered ADHD primarily Inattentive type, 5 individuals ADHD primarily Hyperactive-Impulsive type, and 13 individuals were typed as ADHD Combined type (see Table 3).

Among those with a WURS score of 36 or more, 21 (70.0%) individuals met 6 or more DSM-IV criteria for

Table 3. WURS Related to Barkley Childhood Symptoms Scale, DSM-IV Childhood Diagnostic Criteria and Subtyping of ADHD in Study Sample ($n = 60$).

Barkley Childhood Symptoms Scales	Number of participants above/below cut-off	WURS	
		M (\pm SD) for above/below cut-off	Range for above/below cut-off
Age, M (\pm SD)			
74.37 (5.2)			
Gender			
• Men	30		
• Women	30		
Inattention			
Cut-off (-1.5 SD/7%) > 50 years			
Men: 12.1	19/11	44.74 (12.69)/13.18 (9.79)	36-82/0-32
Women: 8.2	11/19	43.36 (8.43)/10.47 (8.97)	36-59/0-28
Total	30/30	44.05 (10.56)/11.83 (9.38)	36-82/0-32
Hyper-Impulsive			
Cut-off (-1.5 SD/7%) > 50 years			
Men: 10.7	19/11	43.42 (14.20)/15.45 (13.10)	17-82/0-42
Women: 7.4	12/18	41.75 (9.79)/9.72 (8.59)	24-59/0-28
Total	31/29	42.59 (11.99)/12.58 (10.85)	17-82/0-42
Total ADHD score			
Cut-off (-1.5 SD/7%) > 50 years			
Men: 20.9	19/11	44.74 (12.69)/13.18 (9.79)	36-82/0-32
Women: 13.1	11/19	43.36 (8.43)/10.47 (8.97)	36-59/0-28
Total	30/30	44.05 (10.56)/11.83 (9.38)	36-82/0-32
DSM-IV criteria			
Inattention			
6 DSM-IV criteria met			
Total	21/39	44.81 (12.4)/18.72 (16.06)	36-82/0-59
Hyper-Impulsive			
6 DSM-IV criteria met			
Total	18/42	47.78 (13.2)/19.31 (14.81)	36-82/0-43
ADHD subtyping according to DSM-IV criteria met for			
• ADHD primarily inattentive	8		
• ADHD primarily hyperactive-impulsive	5		
• ADHD combined	13		
Total	26		

Note. WURS = Wender Utah Rating Scale; DSM-IV = *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994).

childhood Inattentive-type ADHD, and 18 (60.0%) met 6 or more DSM-IV criteria for childhood Hyperactive-Impulsive-type ADHD. None of the individuals with a WURS score less than 36 met 6 DSM-IV criteria for either of the ADHD subtypes. The mean number DSM-IV criteria met for childhood Inattention-type ADHD among those with a WURS score lower than 36 was 0.07 and for Hyperactive-Impulsive it was 0.50. The mean number DSM-IV criteria met for childhood Inattention-type ADHD among those who scored 36 and above was 6.10 and for Hyperactive-Impulsive it was 5.60. Significant differences in the number of DSM-IV criteria met for childhood Inattentive-type ADHD were found between those with WURS scores of 36 and higher and below 36 ($t = 18, 50, df = 58, p = .000$). Those who reported more childhood ADHD symptoms on WURS also

met more DSM-IV criteria for childhood Inattentive-type ADHD (median = 6.00, $s = 1.77$, range = 1-9). Even the number of DSM-IV criteria met for childhood Hyperactive-Impulsive-type ADHD was significantly different between those with WURS scores of 36 and higher and those less than 36 ($t = 11, 45, df = 58, p = .000$). Participants who rated less childhood ADHD symptoms on WURS also met less DSM-IV criteria for childhood Hyperactive-Impulsive-type ADHD (median = 0.00, $s = 1.08$, range = 0-4). For Hyperactive-Impulsive DSM-IV criteria, 18 (11 men and 7 women) individuals met 6 or more criteria, their mean WURS score being 47.78.

Age was not associated with the number of DSM-IV criteria met for childhood ADHD. The mean number of DSM-IV criteria met for childhood Inattentive-type ADHD

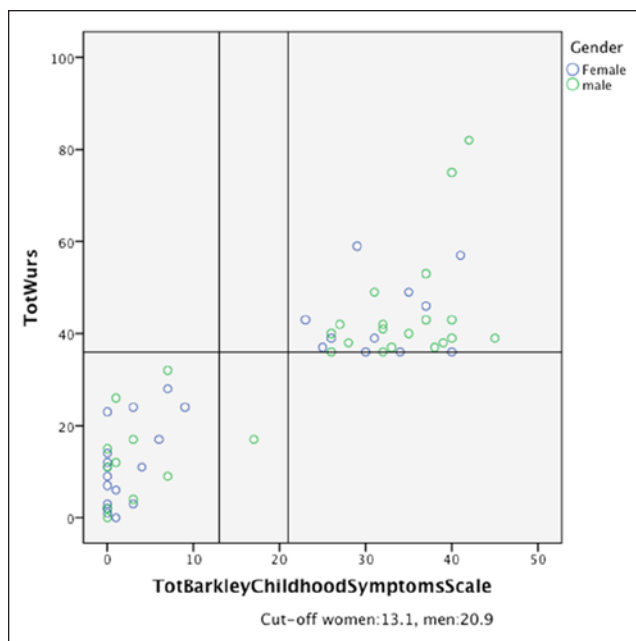


Figure 1. WURS and Barkley Childhood Symptoms Scale.
 Note. WURS = Wender Utah Rating Scale.

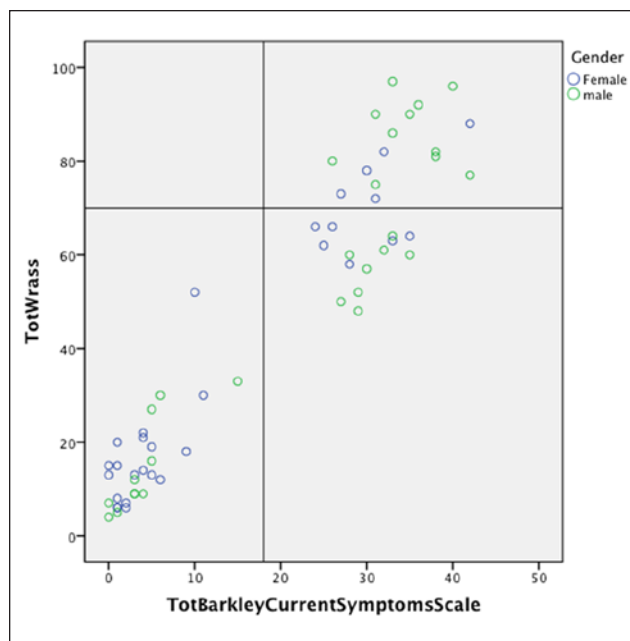


Figure 2. WRASS and Barkley Current Symptoms Scale.
 Note. WRASS = Wender Riktad ADHD Symptom Skala.

and childhood Hyperactive-Impulsive-type ADHD, however, differed significantly between all men and women regarding Inattentive type ($t = -2,964$, $df = 58$, $p = .004$), but not for Hyperactive-Impulsive-type ADHD ($t = -1,833$, $df = 58$, $p = .072$), men met more *DSM-IV* criteria for childhood Inattentive, but not for Hyperactive-Impulsive-type ADHD. Separate analyses of gender differences among those who met six or more childhood *DSM-IV* criteria for Inattentive or Hyperactive-Impulsive-type ADHD revealed similar gender differences for Inattentive-type ADHD ($t = -3,171$, $df = 58$, $p = .002$), men meeting more often six or more criteria for Inattentive-type ADHD. There were no gender differences among those who met six or more criteria for Hyperactive-Impulsive-type ADHD.

- WRASS versus current *DSM-IV* criteria and subtyping

Subtyping into ADHD-subgroups revealed seven individuals being considered ADHD primarily Inattentive type, six ADHD primarily Hyperactive-Impulsive-type and nine individuals were typed as ADHD Combined type.

Among those with a WRASS score of 70 or more, 11 (68.8%) individuals met 6 or more *DSM-IV* criteria for current Inattentive-type ADHD and 9 (56.3%) met 6 or more *DSM-IV* criteria for current Hyperactive-Impulsive-type ADHD. In individuals with a WRASS score below 70, 5 (11.4%) met 6 or more *DSM-IV* criteria for current Inattentive-type ADHD and 6 (13.6%) met 6 or more criteria for current Hyperactive-Impulsive-type ADHD. The

mean number *DSM-IV* criteria met for current Inattentive-type ADHD among those with a WRASS score lower than 70 was 1.64 and for Hyperactive-Impulsive it was 1.73. The mean number *DSM-IV* criteria met for current Inattentive-type ADHD in those who scored 70 and above on WRASS was 6.25 and for Hyperactive-Impulsive it was 5.81. Significant differences in number of *DSM-IV* criteria met for current Inattentive-type ADHD were found between those with WRASS scores of 70 and higher and those with scores below 70 ($t = 6,737$, $df = 58$, $p = .000$). Those who reported more current ADHD symptoms on WRASS also met more *DSM-IV* criteria for current Inattentive-type ADHD (median = 7.00, $s = 2.27$, range = 0-9). Also, the number of *DSM-IV* criteria met for current Hyperactive-Impulsive-type ADHD was significantly greater for those with a WRASS score of 70 and higher compared with those who scored below 70 ($t = 5,965$, $df = 58$, $p = .000$). Those who rated more current ADHD symptoms on WRASS also met more *DSM-IV* criteria for current Hyperactive-Impulsive-type ADHD (median = 6.00, $s = 2.14$, range = 0-9). For Hyperactive-Impulsive *DSM-IV* criteria, 15 (11 men and 4 women) individuals met 6 or more criteria, their mean WRASS score being 75.93.

Age was not associated with the number of *DSM-IV* criteria met for current ADHD. The mean number of *DSM-IV* criteria met for current Inattentive-type ADHD and current Hyperactive-Impulsive-type ADHD, however, differed significantly between all men and women regarding Inattentive type ($t = -2,713$, $df = 58$, $p = .009$) and for Hyperactive-Impulsive-type ADHD ($t = -2,211$, $df = 58$, $p = .031$), men

meeting more *DSM-IV* criteria for current Inattentive and Hyperactive-Impulsive-type ADHD. Separate analyses of gender differences among those who met 6 or more current *DSM-IV* criteria for Inattentive or Hyperactive-Impulsive-type ADHD revealed similar gender differences for Inattentive ($t = -3,009$, $df = 58$, $p = .003$) and for Hyperactive-Impulsive-type ADHD ($t = -2,131$, $df = 58$, $p = .037$), men meeting more often 6 or more criteria for Inattentive and Hyperactive-Impulsive-type ADHD.

To sum up, all 30 (100%) participants with a WURS score of 36 or more surpassed the cut-off for the total childhood ADHD score on Barkley CSS–Child Recall scale. Similarly, 26 (87%) participants with a WURS score of 36 or more met *DSM-IV* criteria for childhood ADHD. All 30 (100%) participants from our total sample that surpassed the Barkley cut-off for childhood ADHD also surpassed the Barkley cut-off for adult ADHD on Barkley CSS. Interestingly, 14 participants with a WRASS score below 70 (Swedish clinical cut-off) besides those 16 participants with a WRASS score of 70 or more met Barkley cut-off for current ADHD. Similarly, 22 (85%) participants in our sample who met *DSM-IV* criteria for childhood ADHD continued to meet *DSM-IV* adult ADHD criteria.

Psychiatric History and Dementia

In individuals with a WURS score of 36 or more, 10 (33%) also reported current psychiatric contact. None of the individuals with a WURS score less than 36 reported such contact. More than half (53%) of those with a WURS score of 36 or more reported previous psychiatric contacts, compared with 12 individuals (40%) of those with a WURS score below 36. Notably, none in our entire sample had had psychiatric contact in their childhood. Six (20%) individuals with a WURS score of 36 or more had past psychiatric hospitalization, but none of those with a WURS score below 36. Depression, anxiety, and suicidal thoughts were most common among those with a WURS score of 36 or more. Distribution of psychiatric disorders present in childhood are shown in Table 4.

A review of medical records in the entire sample showed none had experienced a previous assessment for suspected dementia or been diagnosed with dementia.

Discussion

Our study was designed to compare currently used self-report scales for identifying ADHD symptomatology over the lifespan. Information was provided in a population-based sample aged 66 to 86 using an interview assessment.

The main finding was that of a significant correspondence in self-reported ADHD symptoms in using *DSM-IV* criteria and Wender and Barkley scales. Those who reported more childhood and current ADHD symptoms on the WURS and WRASS scales also rated more childhood and current

Table 4. Past Psychiatric History ($n = 60$).

Total sum WURS score	0-35, $n = 30$	36-100, $n = 30$
Age, $M (\pm SD)$	75.5 (4.7)	73.2 (5.5)
Gender		
• Men	36.7%	63.3%
• Women	63.3%	36.7%
Current psychiatric contact		
• Yes	0.0%	33.3%
• No	100.0%	66.7%
Past psychiatric contact in childhood		
• Yes	0.0%	0.0%
• No	100%	100%
Learning disability in childhood		
• Yes	0.0%	3.3%
• No	100.0%	96.7%
Past psychiatric contact in adulthood		
• Yes	40.0%	53.3%
• No	60.0%	46.7%
Past psychiatric hospitalization in adulthood		
• Yes	0.0%	20.0%
• No	100.0%	80.0%
Depression in adulthood		
• Yes	40.0%	50.0%
• No	60.0%	50.0%
Suicidal thoughts in adulthood		
• Yes	10.0%	23.3%
• No	90.0%	76.7%
Suicide attempts in adulthood		
• Yes	0.0%	10.0%
• No	100.0%	90.0%
Anxiety in adulthood		
• Yes	10.0%	26.7%
• No	90.0%	73.3%
Alcohol/drug abuse in adulthood		
• Yes	3.3%	6.7%
• No	96.7%	93.3%
Obsessive compulsive disorder in adulthood		
• Yes	0.0%	0.0%
• No	100.0%	100.0%
Antisocial personality in adulthood		
• Yes	0.0%	0.0%
• No	100.0%	100.0%
Bipolar disorder in adulthood		
• Yes	0.0%	6.7%
• No	100.0%	93.3%
Oppositional defiant disorder in adulthood		
• Yes	0.0%	0.0%
• No	100.0%	100.0%

Note. WURS = Wender Utah Rating Scale.

symptoms on the Barkley childhood and current symptoms scales. Furthermore, those who rated more childhood and current ADHD symptoms in the Wender and Barkley scales

also met more *DSM-IV* criteria for childhood and current adult ADHD. Similarly, individuals who reported less childhood and current ADHD symptoms on Wender scales reported to a lesser degree childhood and current ADHD symptoms on the Barkley scales. They also met less of the *DSM-IV* criteria for childhood and current adult ADHD.

Like most of the major rating scales used for screening patients for ADHD, Barkley scales are modeled on the criteria laid out in the *DSM-IV*, whereas the Wender Scales are based on the more restrictive Utah criteria. Comparison of these measures, however, revealed similar outcomes. Notably, more of those who rated less current ADHD symptoms on Wender scale (WRASS) met criteria for current ADHD using Barkley scale, perhaps due to more age-appropriate cut-off points for current symptoms in an age group of those 50 years and older. In our sample of 30 individuals with a WURS score of 36 or more, 16 individuals (53%) also scored 70 or more on the WRASS. Furthermore, using Barkley Current Scale for Inattention-type ADHD, 29 individuals from our total sample of 60 individuals could be identified, 31 individuals scored above cut-off for Hyperactive-Impulsive-type ADHD and 30 individuals scored above cut-off for total ADHD score. In our total sample half of them or 30 individuals, corresponding to 100% of those with a WURS score of 36 or more were identified meeting criteria for ADHD using Barkley scores.

Concerning the *DSM-IV* criteria, 87% or 26 individuals with a WURS score of 36 or more from our total sample met the childhood diagnostic criteria for ADHD. Furthermore, 73% or 22 individuals with a WURS score of 36 or more met adult diagnostic criteria for ADHD (7 individuals ADHD primarily Inattentive type, 6 individuals primarily Hyperactive-Impulsive-type and 9 individuals ADHD Combined type) as laid out in *DSM-IV*. Considering changes of diagnostic criteria for ADHD in *DSM-5* our results confirm the importance of recognizing the lifespan perspective of ADHD, since there is no specific age when ADHD fades. Our results courage further development and use of age-appropriate diagnostic criteria identifying ADHD in different age groups.

Because other psychiatric disorders may account for a later onset of similar symptoms, we also assessed psychiatric comorbidity in childhood and currently. The results support the idea of co-existing psychiatric disorders besides a lifelong ADHD history with typical symptoms. By a review of medical records, we could partly account for other disorders with a later onset, including dementia. Among those whom we identified in later life with a previously unrecognized lifelong ADHD, we found that past and current psychiatric problems were more prevalent, compared with those without an ADHD history. Past psychiatric hospitalization, depression, suicidal thoughts and attempts, anxiety, alcohol/drug abuse, learning disability, and bipolar disorder were more common among those we identified with persistent ADHD.

Age was not associated with the Barkley Childhood or Current Symptoms Scales. Age was not associated with the number of *DSM-IV* criteria for childhood ADHD met, nor with the number of *DSM-IV* criteria for current ADHD met. The mean Barkley Current Symptoms Scale scores, however, differed significantly between men and women, men rated more current ADHD symptoms. Separate analyses at the item level among those with a Barkley Current Symptoms Scale score below and above cut-off score revealed no gender differences. The mean number of *DSM-IV* criteria met for childhood Inattentive-type ADHD and childhood Hyperactive-Impulsive-type ADHD, differed significantly between men and women regarding Inattentive type but not for Hyperactive-Impulsive-type ADHD, men meeting more criteria for childhood Inattentive-type ADHD. Men also met more *DSM-IV* criteria for current Inattentive but not for Hyperactive-Impulsive-type ADHD. Analyses of gender differences among those who met 6 or more childhood *DSM-IV* criteria for the Inattentive revealed similar differences.

Limitations and Strengths

A main limitation of the present scale comparisons is the small sample size, reliability of self-reports and the fact that the participants' WURS results from our previous study (Guldborg-Kjär & Johansson, 2009) were not blind for the interviewer which was not a realistic alternative as the interviewer, T.G.-K., for a practical reason conducted all the interviews. The subsample of 60 individuals based on their total WURS score used in this study is not completely unbiased as individual WURS scores from our original sample of 1,599 individuals determined the further comparison groups. Ideally, it would have been to prefer comparison of different methods using our original sample of 1,599 individuals (Guldborg-Kjär & Johansson, 2009). The format and procedure with an extensive in-person interview restricted our sample size for many reasons, including logistics and practicalities. The small sample size in the present study is mainly due to the attrition among those from our previous study (Guldborg-Kjär & Johansson, 2009) who had WURS score 36 or more. This of course is a weakness and might lead to association by error. The possible lack of accurate recall of childhood conditions as well as the risk for under- and overestimation of symptoms concerning past long ago as well as the ability to provide valid information about the present behavior must also be considered as possible biases. On the other hand, this is the only realistic alternative in older adults. There are no parents or teachers available and no significant others who could provide objective information or otherwise confirm self-evaluations. A potential confirmative source in a clinical setting might be reports from siblings and children, however, a method that was less feasible in the present population-based study.

A major strength in the study was the population-based approach with a randomly drawn sample of individuals not dependent on the researchers, which is likely to facilitate participants in reporting more truthfully. Our findings may not be generalizable for all older adults with ADHD symptoms, but are likely to be generalized to similar birth cohorts and social settings for individuals currently in the age range 66 to 86.

In conclusion, we compared capture among various scales used in assessments of ADHD symptomatology and found an overall high agreement across scales. Our study also provides evidence for the assumption of a significant persistence of self-reported ADHD symptoms over the life course. There seems not to be any particular age when ADHD ceases to be active, on the contrary for the vast majority of those who experienced childhood ADHD also report that symptoms continue to affect them in old age. Besides the challenge in current psychogeriatric practice and research to focus on a disorder that persists, our study shows a substantial concordance in capture among currently used scales for identifying ADHD.

Declaration of Conflicting Interests

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