Psychiatr Q (2018) 89:505–510
https://doi.org/10.1007/s11126-017-9553-4

ORIGINAL PAPER

Comparison of the Adult ADHD Self Report Scale Screener for DSM-IV and DSM-5 in a Dually Diagnosed Correctional Population

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Published online: 22 December 2017

Abstract The diagnosis of Attention Deficit Hyperactivity Disorder in adults with Substance Use Disorders is complicated. A specific screening tool, such as the World Health Organization Adult ADHD Self Report Scale Screener can be the first step in identifying the condition. Recently, the screener has been revised because the Diagnostic and Statistical Manual of Mental Disorders, Fifth edition, made some changes to the criteria for Attention Deficit Hyperactivity Disorder. This study compared the screeners based upon the Fourth and Fifth edition of the Manual. One hundred and forty patients, including seventy with Attention Deficit Hyperactivity Disorder, completed both screeners, independent from a clinical diagnostic interview. The sensitivity, specificity, and predictive values were calculated based on four different scoring methods: a categorical score of three or four positive answers, and a dimensional score of twelve or fourteen. Both screening instruments appeared to perform equally without significant differences between them, no matter which scoring system was used. However, the only satisfactory result was obtained using the dimensional scoring with a cutoff of 12, providing a sensitivity and negative predictive value above 80%. This is a lower cut off than recommended in community and clinic samples. It is possible that the cut off of the screener may need to be adjusted depending on the circumstances within which it is used.

Keywords Adult ADHD · Substance use disorders · DSM IV screener · DSM-5 screener

Introduction

The prevalence of Attention Deficit Hyperactivity Disorder (ADHD) in the general population was estimated to be 2.5% [1]. A much higher prevalence of ADHD is found in patients with substance use disorders (SUD) [2]. Likewise, while the prevalence of SUD in the community

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is around 14% [3], a much higher proportion of ADHD patients present with SUD [4]. It seems that there is a complex relationship between ADHD and SUD: the family history for both ADHD and SUD is increased in both ADHD and SUD individuals, ADHD in childhood is a risk factor for early onset SUD, and adults with ADHD appear to have a more prolonged course of SUD. Finally, pharmacotherapy of ADHD reduces the risk for SUD to that in the general population [5].

The diagnosis of ADHD in adults and particularly in patients with SUD is complicated, mostly because of overlapping symptoms with other syndromes. A specific screening tool for ADHD can be the first step in identifying the condition. A frequently used instrument is the World Health Organization Adult ADHD Self Report Scale Screener (ASRS). The ASRS screener is a 6 item questionnaire that is scored on a 0–4 scale, with some questions given more weight than others. However, in a community population, the unweighted version performed better [6]. Some researchers have recommended using the dimensional scoring system (0–24) rather than a categorical rating of 0–6 positive items [7].

The use of the ASRS screener has been studied in addiction patients: it was found to be useful with acceptable validity, and with very few missed cases of ADHD among those screening negative [8, 9]. Less favorable results have been published as well however [10].

Recently, the ASRS screener has been revised because the DSM-5 criteria for ADHD were changed, especially as they apply to adults: the number of criteria necessary for a diagnosis was lowered and the cut off age for the presence of initial symptomatology was increased. The revised ASRS for DSM-5 was found to be useful as a screening tool in specialty treatment settings [11].

This study compared the ASRS screener based upon DSM IV (ASRS-IV) with the revised ASRS screener based upon DSM-5 (ASRS-5) in a correctional dually diagnosed, addiction and psychiatric, patient population. The following a priori decisions were made: the diagnosis of ADHD would be made on clinical grounds, according to DSM-5 criteria, by a child and adolescent psychiatrist with 27 years of experience in diagnosing and treating youth and adults with ADHD; the unweighted versions of the screeners would be used; categorical scores of 3/6 and 4/6, and dimensional scores of 12/24 and 14/24 to screen positive would be investigated.

Methods

Inmates were referred for a psychiatric evaluation after placement in a Community Correctional Center (CCC) for treatment of their addiction and psychiatric conditions, as part of their community reintegration. They gave written informed consent to be evaluated and to fill out the measure. A clinical psychiatric interview determined diagnoses based on DSM-5 criteria and determined a Clinical Global Impression-Severity Scale (CGI). Only patients who were dually diagnosed were included. Patients filled out the ASRS-IV and ASRS-5 independent of the psychiatric assessment. Subjects were randomized according to completing the ASRS-IV versus the ASRS-5 first, and according to completing the ASRS screeners before versus after the psychiatric assessment. Patients who were being treated for ADHD upon their arrival in the CCC were excluded, although the identification and treatment of ADHD in the jail and prison system is rare. Only patients with a CGI of 3 or more were included, indicating at least a mild level of symptomatology. Some patients' ADHD symptomatology could indeed have been ameliorated by treatments not intended for that purpose. For example, secondary amine tricyclic antidepressants are frequently used in the prison system for treatment of depression,

anxiety and chronic pain. Secondary amine tricyclics have been found to reduce ADHD symptoms [12]. The sensitivity, specificity, positive predictive value and negative predictive value for the ASRS-IV and the ASRS-5 were calculated using different cut off scores. The literature supports a categorical cut-off of 4/6 or a dimensional cut-off of 14/24 to consider a positive screen [7]. Because of clinical experience in using the ASRS-IV, two lower thresholds were investigated as well: a categorical score of 3/6 and a dimensional score of 12/24.

Results

One hundred and forty patients were included.

Seventy patients (45 males) with a diagnosis of ADHD had a mean age of 33.5+/−8.3. All 70 patients had substance use diagnoses, co-morbid with ADHD and the following psychiatric conditions: depressive disorders ($n = 22$), anxiety disorders (n = 22), PTSD ($n = 17$), bipolar disorders ($n = 16$), adjustment disorders ($n = 5$), OCD (n = 2), psychotic disorder ($n = 1$), eating disorder (n = 1), and intermittent explosive disorder (n = 1). Severity indicators included prior inpatient rehabilitation ($n = 55$), prior inpatient psychiatric treatment ($n = 27$), a history of abuse/trauma ($n = 36$), and prior suicide attempts ($n = 15$). Thirty-four patients received ADHD pharmacotherapy in childhood.

Seventy patients (48 males) without a diagnosis of ADHD had a mean age of 36.9 +/− 9.1. All 70 patients had substance use diagnoses, co-morbid with the following: anxiety disorders ($n = 21$), depressive disorders ($n = 19$), adjustment disorders ($n = 16$), bipolar disorders ($n = 11$), PTSD ($n = 9$), intermittent explosive disorders ($n = 4$), psychotic disorders ($n = 2$), and eating disorder (n = 1). Severity indicators for this group included prior inpatient rehabilitation ($n = 41$), prior inpatient psychiatric treatment ($n = 21$), a history of abuse/trauma ($n = 26$), and a history of suicide attempts ($n = 7$). Two patients reported receiving ADHD pharmacotherapy in childhood.

It thus appears that the ADHD population had a more severe course of illness, as manifested by more psychiatric hospitalizations, more inpatient rehabilitations, more exposure to traumatic events (and more PTSD), and more suicide attempts.

Tables 1, 2, 3 and 4 show the results of the sensitivity, specificity, positive predictive value and negative predictive value of four different scoring methods of the ASRS-IV and ASRS-5.

Discussion

Certain limitations need to be considered in the interpretation of this study. Diagnoses were made by clinical interview. This may decrease the internal validity of the study, but increases the ecological validity. Most psychiatric diagnoses in community practices are indeed not made through structured interviewing but rather through a clinical process. The patient

Table 1 Categorical scoring of the ASRS with 4+ answers as threshold

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
ASRS-IV	36%	93%	83%	59%
ASRS-5	36%	94%	86%	59%

Table 2 Dimensional scoring of the ASRS with 14 as threshold

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
ASRS-IV	60%	86%	81%	68%
ASRS-5	64%	86%	82%	71%

population was a correctional dual diagnosis cohort which may limit generalizability to other, less complicated, practices. On the other hand, ADHD is very common in patients with addictive disorders and is a poor prognostic indicator. Routine screening of patients with substance use disorders is highly recommended.

The study did build in some safeguards against certain halo effects, such as randomization related to which screening tool was filled out first and randomization related to the timing, before or after the evaluation, of the screening tool assessment. Patients with borderline symptomatology were excluded as were patients whose medication regimen may have ameliorated ADHD symptomatology. On the other hand, a significant heterogeneity of diagnoses existed: many patients suffered from conditions interfering with attentional capacity, such as depression, bipolar disorder, anxiety disorders. Also, several medication regimens may have interfered with their attention span, such as topiramate, which is frequently used in the prison system. These facts may have influenced the current findings as well.

Both screening instruments appear to perform equally without significant difference between them, no matter which scoring system was used. In reviewing the different scoring methods, it appears that the only one giving satisfactory results in terms of sensitivity, specificity and predictive values is the dimensional scoring system with a cutoff of 12/24. A good screening tool should provide adequate sensitivity and adequate negative predictive value: patients with the condition should indeed screen positive, while a reliable negative predictive value helps preserve time by avoiding unnecessary additional assessments. The dimensional scoring system with a cutoff score of 12 had a sensitivity and negative predictive value above 80%.

With categorical scoring and a cut off of 4 positive answers, a high number of false negative answers occurred, leading to an unacceptable low sensitivity of 36% and negative predictive value of 59% with both screeners. These parameters improved with a categorical score of 3 positive answers and a dimensional score of 14, but still remained unacceptably low. Only the dimensional scoring with 12/24 as a cut off had acceptable sensitivity of 83% and 81% and negative predictive value of 82% and 79% with the ASRS-IV and the ASRS-5 respectively. These values compare favorably with numbers obtained in other dually diagnosed populations [8, 9].

One possible explanation for the high number of false negative findings with the recommended cut offs is the fact that this study was performed soon after the arrival of the patients in a CCC. ADHD symptoms do not occur in a vacuum and the demands placed on the patients in

Table 3 Categorical scoring of the ASRS with 3 + answers as threshold

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
ASRS-IV	59%	86%	80%	67%
ASRS-5	60%	84%	79%	68%

Table 4 Dimensional scoring of the ASRS with 12 as threshold

	Sensitivity	Specificity	Positive predictive value	Negative predictive value
ASRS-IV	83%	77%	78%	82%
ASRS-5	81%	71%	74%	79%

the early stages of their stay at the CCC may have been minimal, compared to patients who function within a family and occupational context.

The ASRS-IV and the ASRS-5 performed equally in this setting. While both contain core DSM criteria for ADHD, the DSM-5 included 2 items relating to deficits in executive functioning. However, items related to ADHD and executive functioning many times overlap, such as "When you have a task that requires a lot of thought, how often do you avoid or delay getting started?" (core symptom in ASRS-IV) and "How often do you put things off until the last minute?" (executive functioning related symptom in ASRS-5). As such, both screeners may tap into similar constructs.

In summary, the ASRS-IV and ASRS-5 performed similarly in this dually diagnosed correctional patient population with acceptable parameters by using a lower cut off than recommended in community and clinic samples. It is possible that the cut off of the ASRS-5 may need to be adjusted depending on the circumstances within which the screener is used.

Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Conflict of Interest The authors declare that they have no conflict of interest.

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