Criminal Convictions in Norwegian Female and Male Adult ADHD Outpatients: Prevalence and Associations With ADHD Symptom Severity and Emotional Dysregulation

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Abstract

Objectives

Attention Deficit Hyperactivity Disorder (ADHD) often co-occurs with antisocial behaviour. Several studies have shown high rates of ADHD among prisoners. However, the prevalence of crime among individuals with ADHD is less known. The aim of the present study was to estimate the prevalence of lifetime criminal conviction (CC) in a clinical sample of adults with ADHD, and the associations with severity of ADHD and emotional dysregulation (ED).

Methods

Patients were admitted to a private psychiatric outpatient clinic in Oslo between 2014 and 2018. Out of 656 patients diagnosed with ADHD, 629 (95.9%) agreed to participate in the study. CC was determined based on self-reporting of the lifetime history of criminal behaviour. ADHD was diagnosed according to DSM-5 criteria, and the ADHD severity was measured using the Adult ADHD Self Report Scale (ASRS). ED was assessed by the eight-item version of Barkley's Current Behaviour Scale - Self Report (CBS-SR).

Results

The prevalence of self-reported CC in this clinical sample was 11.7% among women and 24.5% among men. CC was associated with hyperactive-impulsive severity ($p < 0.001$) and ED ($p = 0.006$).

Conclusions

The prevalence of self-reported lifetime criminal conviction was high for both genders. CC was associated with symptom severity of hyperactivity-impulsivity and emotional dysregulation.

Introduction

Attention Deficit Hyperactivity Disorder (ADHD) often co-occurs with antisocial behaviour (Sourander et al. 2006; Mohr-Jensen & Steinhausen. 2016). Several studies have estimated the prevalence of ADHD among male inmates to range between 15-50% (Rösler et al. 2004; Einarsson et al 2009; Ginsberg et al. 2010; Usher et al, 2013; Knecht et al. 2015). Meta-analyses have indicated an average of around 25% in male inmates (Young et al. 2015; Baggio et al. 2018), and even as high as 40% in female inmates (Farooq et al. 2016). These rates far exceed the estimated 3-5% prevalence rates of ADHD in the general adult population (Fayyad et al. 2007; Kessler et al. 2006).

Longitudinal studies find ADHD children to have a high risk of later antisocial activity and CC in adulthood (Fletcher & Wolfe. 2009). Long-term outcome of Danish children with ADHD indicated that nearly half got a criminal conviction (CC) in adulthood (Dalsgaard et al. 2013). Others found girls with ADHD to have seven times higher odds for having an incarceration record compared to non-ADHD girls, while boys with ADHD had two times higher odds (Silva et al. 2014). A Swedish national register-based

study found 15.4% of women and 36.6% of men with ADHD convicted of any crime (Lichtenstein et al. 2012). Several studies have indicated that CC and antisocial behaviour are correlated with the severity of ADHD (Young & Thome. 2011; Mohr-Jensen & Steinhausen. 2016; Mordre et al 2011; Unnever & Cornell. 2003; Du Rietz et al. 2017).

Previous studies have found general adjustment problems to be linked to antisocial behaviour in adults with ADHD (Young and Gudjonsson. 2006), and being largely mediated by emotional lability and anger problems (Gudjonsson et al. 2014). Excessive and inappropriate emotional expressions, irritability, and temper outbursts may be captured as the clinical expression of Emotional Dysregulation (ED) (Shaw et al. 2014; Stringaris. 2011). ED is a common feature in ADHD, even though it is not part of the criteria of the disorder (Aldao et al. 2016; Shaw et al. 2014; Connor et al. 2010; Landaas et al. 2012; Barkley et al. 2010; Barkley & Fischer. 2010; Surman et al. 2011; Surman et al, 2013; Retz et al. 2012; Corbisiero et al. 2017; Hirsch et al. 2018).

ED in adults is clinically similar to conduct disorder in youth, which has been linked to antisocial behaviour (Mannuzza et al. 1989; Mannuzza et al. 2008; Satterfield et al. 2007; Mordre et al. 2011). Whether the severity of ED is associated with CC has yet to be shown.

The aims of the present study were to estimate the prevalence of CC in a clinical sample of outpatients with ADHD, and to examine its associations with ADHD symptom severity and ED.

Methods

This was an observational cross-sectional clinical study.

Participants

The study population consisted of adult outpatients, not imprisoned, aged 18 to 65, who fulfilled the diagnostic criteria for a diagnosis of ADHD according to Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (APA. 2013). Patients were admitted to a private outpatient non-inmate psychiatric clinic in Oslo, Norway, specialized in clinical assessment and treatment of adults with ADHD.

Recruitment was conducted between 2014 and 2018. ADHD was assessed using DIVA 2.0 the semi-structured Diagnostic Interview for Adult ADHD, second edition (Kooij & Francken 2010) which was performed by a psychiatrist for all patients included in the study. The DIVA 2.0 is a reliable tool for assessing and diagnosing Adult ADHD (Ramos-Quiroga. 2019). During these years, 656 of the assessed patients fulfilled the diagnostic criteria of ADHD and were invited to participate in the study, of whom 65% were self-referred and 35% were referred by healthcare practitioners. None of the participants used prescribed stimulant medication at the time of assessment. There were no exclusion criteria.

Out of 656 patients (351 men and 305 women) with ADHD, 629 (95.9%) gave written informed consent to participate in the study. The study was approved by the Regional Medical Ethics Committee, South-East

Norway, 2015/426. Assessments were carried out in accordance with ethical standards, and the principals of the Declaration of Helsinki.

Measures

The age of the participants was recorded as their respective numbers of lived years when entering the study. Gender was recorded as women (scored as 0) or men (scored as 1) from information revealed by the participant. Sociodemographic information: If participant was married or cohabitant this was scored as 1, and if not scored as 0. If participant was living with children, inclusive partial custody was scored as 1, and if not (event though having children somewhere else) scored as 0. Educational level was categorized by number of years in education; 12 years or less scored as 1, 13-15 years scored as 2, or more than 15 years scored as 3. Work participation was defined as 'yes' and scored as 1 if work was reported as the main source of income, and if not scored as 0.

Criminal conviction (CC) was recorded as positive and scored as 1, when participant self-reported CC, and we recorded what they were convicted of. Absence of CC was scored as 0.

ADHD symptom severity was measured by Adult ADHD Self-Report Scale (ASRS) Symptom Check List, v1.1 (Adler, Kessler & Spencer. 2003; Kessler et al. 2005; WHO 2007). The ASRS is a reliable and valid screening instrument for evaluating ADHD in adults (Silverstein et al. 2017). This 18-item version yields a score ranging from 0 to 72 points. We recorded subdivisions of the ASRS questionnaire, as inattentive items (item 1-4 and 7-11) and hyperactive - impulsivity items (item 5, 6, and 12-18) separately (Fredriksen et al. 2014).

ED was assessed by using the relevant eight items from Current Behaviour Scale - Self Report questionnaire (Barkley. 1997; Barkley et al. 2010; Surman et al. 2013; Biederman et al. 2012). The eight items were; 1: Quick to get angry or become upset; 2: Easily frustrated; 3: Overreact emotionally; 4: Easily excited by activities going on around me; 5: Lose my temper; 6: Argue with others; 7: Am touchy or easily annoyed by others; 8: Am angry or resentful. The items were by participant marked as never or rarely (0), sometimes (1), often (2) or very often (3). This yielded a total ED score ranging from 0 to 24.

Alcohol and drug use disorders were diagnosed using the specific module of the Mini International Neuropsychiatric Interview (M.I.N.I.), Norwegian Translation Version 6.0.0, according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria. (Sheehan et al. 1997; Sheehan et al. 1998). Dependence and abuse were merged to "use" disorder (as in M.I.N.I. version 7.0 / DSM-5), and questions were both restricted to the last 12-months and related to lifetime prevalence.

Statistical analysis

Numbers with percent proportion (%) were reported for all categorical variables. Means with standard deviations (SD) were given for continuous variables. We used chi-square (χ^2) tests to compare categorical variables and independent sample T-tests to compare continuous variables. We used logistic regression

analyses to examine the associations between CC outcome variable, and age, gender, ADHD symptom severity and ED as independent variables. All tests were two-tailed, and differences were considered significant if $p < 0.05$. There were no missing data. All statistical analyses were done using the software package IBM 2016 SPSS version 22 (IBM. 2016).

Results

Table 1 shows participants with and without a history of CC. Those with a history of CC were older, more often men, had a lower educational level, were less involved in family life and work, and had a higher risk of a history of alcohol or drug use disorders.

The prevalence of CC was 11.7% ($n = 34$) in women and 24.5% ($n = 83$) in men.

Among women ($n = 290$), the most common conviction was for selling or possessing drugs ($n = 18$; 6.2%), followed by violence, ($n = 6$; 2.1%), traffic crime ($n = 6$; 2.1%), theft ($n = 2$; 0.7%), and mixt or plural convictions ($n = 2$; 0.7%).

Among men ($n = 339$), the most common conviction was for selling or possessing drugs ($n = 32$; 9.4%), followed by violence, ($n = 24$; 7.1%), traffic crime ($n = 14$; 4.1%), theft ($n = 5$; 1.5%), and mixt or plural convictions ($n = 8$; 2.4%).

Hyperactive-impulsive symptoms and ED were higher in patients who had a history of CC (table 1). Table 2 shows that hyperactive-impulsive symptoms and ED were associated with CC even when adjusted for age and gender.

There were no significant interactions between age, gender, hyperactive-impulsive symptom severity and ED.

Discussion

Our results show that the prevalence of CC was high, and associated with both hyperactive-impulsive symptom severity and ED.

The 11.7% prevalence of CC among women and the 24.5% prevalence among men are slightly lower than what have been documented in a Swedish register-based study (Lichtenstein et al. 2012), and considerably lower than what was found in a follow-up study of Danish children (Dalsgaard et al. 2013). However, our estimates are much higher compared to the estimated lifetime prevalence of CC in the general Norwegian population, accumulated up to age 36 being 0.9% for women and 5% for men (Skardhamar. 2014). Our findings demonstrate that patients receiving an ADHD diagnosis in adulthood often also have a history of CC.

The two or threefold higher risk of CC among men versus women is in line with other studies of ADHD patients (Dalsgaard et al. 2013; Silva et al. 2014; Knecht et al. 2015). The ratio is similar to that in the

general population (Skardhamar. 2014; Walker & Maddan. 2016), which indicates that gender differences are not affected by ADHD.

The finding that CC was associated with the severity of hyperactive-impulsive symptoms is in line with several studies that have shown associations between the severity of ADHD symptoms and different aspects of antisocial behaviour (Gudjonsson et al. 2013; Gudjonsson et al. 2014; Gudjonsson et al. 2016; Gudjonsson et al. 2019; Gonzalez et al. 2016; Thapar et al. 2006; Storebø et al. 2016). It is also consistent with longitudinal studies of children with ADHD showing that the severity of hyperactivity-impulsivity symptoms was associated with later occurrence of CC (Dalsgaard et al. 2013; Pingault et al. 2013). It is likely that restlessness and impulsivity symptoms may result in less well-considered behavior that may also include violation of law. It is also possible that criminal acts by people with hyperactive-impulsive symptoms are more sensation and novelty seeking (Donfrancesco et al 2015, Mann et al 2017), and less planned and proactive, and that people with ADHD therefore are more likely being convicted (Young. 2007).

With this aspect in mind, it seems meaningful to address the severity of ADHD as emphasized in DSM-5, contrary to categorize ADHD by sub-types as suggested in DSM-IV. The strong association between CC and hyperactive-impulsive severity also underlines the importance of treating ADHD as a dimensional diagnosis and expecting more antisocial behavior in patients presenting with high levels of hyperactive-impulsive symptoms.

In our sample, CC was associated with the severity of ED, independent of the hyperactive-impulsive severity. We suggest that ED does add significantly to the understanding of CC in people with ADHD.

Firstly, ED is a common feature of ADHD, even though not being part of the diagnostic criteria (Aldao et al. 2016; Shaw et al. 2014; Connor et al. 2010; Landaas et al. 2012; Barkley. 2010; Barkley & Fischer. 2010; Surman et al. 2011; Surman et al. 2013; Retz et al. 2012; Corbisiero et al. 2017; Hirsch et al. 2018), Secondly, ED contributes significantly to the general impairments in patients with ADHD (Faraone et al 2018), and has an independent effect on general social problems associated with ADHD (Surman et al. 2013; Musser et al. 2013). Thirdly, aggression in childhood has been found to predict criminality later in life (Pingault et al. 2013), and personality traits of negative emotionality have been linked to criminal activity (Krueger et al. 1994).

We found a strong relationship between all background variables and CC. The association between low education and CC is notable since people with ADHD have lower levels of education than the general population (Ebejer et al. 2012; Küpper et al. 2012; Barkley et al. 2006). Also, drug use disorder was correlated with CC, which is worth noting since ADHD patients have higher incidences of drug use (Gudjonsson et al. 2014; Dalsgaard et al. 2014; Von Polier et al. 2012; Crunelle et al. 2018; Anker et al. 2020). Early identification of ADHD and disruptive behaviour, with subsequent multimodal interventions might reduce the risk of a criminal trajectory. Supporting people with ADHD attaining higher education and avoiding drugs is probably also a good approach to prevent CC.

There are some methodological limitations to consider in this study. CC was based on self-report which may have resulted in underreport.

Patients attended to a private and not governmentally funded clinic may not be representative for patients with ADHD in general. They may have a higher socio-economic status and be less impaired, compared to public outpatient clinics or prison inmates. Also, the prevalence rates of criminality and morbidity may not be representative for the total ADHD patient population. Since representativeness is time- and place-specific there will always be a historical concept (Olsen. 2013). We assume that differences in sample selection may primarily affect the prevalence rates, and to a lesser extent their associations (Nohr & Olsen. 2013; Rothman et al. 2013). The associations with CC should therefore be more general.

The cross-sectional observational design limits the interpretation of causal relationships. We assume ADHD and ED are personality traits developing in childhood before criminal minimum age, which is 15 years of age in Norway, and therefore may indicate a direction of causality.

Conclusion

In this clinical sample the prevalence of self-reported lifetime criminal conviction (CC) was high for both genders compared to prevalence rates reported in the general population. CC was associated with the severity of hyperactivity and impulsivity, as well as emotional dysregulation, which indicate that both features contribute to the understanding of CC in ADHD.

Clinical implication:

Lifetime self-reported CC is common in adults with ADHD. Higher severity of hyperactivity-impulsivity symptoms and emotional dysregulation is associated with CC and should be treated with consciousness. There's a need for early identification and different approaches in prevention and treatment of ADHD and externalising behaviour. Further, targeted interventions should focus on the preventive effect of academic achievement and higher education for adolescents with ADHD, which could be crucial in order to avoid illegal drug use, antisocial behavior and delinquency.

Abbreviations

ADHD: Attention Deficit Hyperactivity Disorder

ED: Emotional Dysregulation

MINI: Mini International Neuropsychiatric Interview

ASRS: Adult ADHD Self Report Scale.

CC: Criminal conviction

Declarations

We confirm that all methods were performed in accordance with relevant guidelines and regulations.

Ethics approval and consent to participate: The study was approved by the Regional Medical Ethics Committee, South-East D, Norway, 2015/426. Written consent to participate was obtained from all participants.

Consent for publication: Not applicable

Availability of data and materials: Data are collected from a private psychiatric outward in Oslo. Public availability would compromise privacy of the respondents. According to the approval from the Norwegian Regional committees for medical and health research ethics, the data have to be stored properly and in line with the Norwegian Law of privacy protection. However, anonymized data are freely available to interested researchers upon request, pending ethical approval from the ethics committee. Interested researchers can contact project leader Espen Anker (espen.anker@online.no) with requests for the data.

Competing interests: EA has received speaker honoraria from Shire. TH report no competing interest. YG has received personal fees and non-financial support from Medscape, non-financial support from Shire, and personal fees from Studentlitteratur, all outside the submitted work.

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Authors' contributions: EA and TH designed the study. EA collected and analyzed the data. All the authors participated actively in the writing of the manuscript. All authors approved the final draft.

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Tables

Tables 1. Demographics and clinical features in a sample of adult ADHD patients with and without a history of criminal conviction. Participants were recruited in an outpatient psychiatric clinic specialized in examination and treatment of ADHD.

	Total sample n=629	Criminal Conviction n=117	No-Criminal Conviction n=512	p-value
Age, mean yrs. (SD)	36.7 (11.4)	39.8 (10.0)	35.9 (11.6)	0.020
Gender: Women, n (%)	290 (46.1)	34 (29.1)	256 (50.0)	<0.001
Men, n (%)	339 (53.9)	83 (70.9)	256 (50.0)	
Years of education: ≤ 12: (%)	321 (51.0)	92 (78.6)	229 (44.7)	<0.001
13-15: (%)	248 (39.4)	24 (20.5)	224 (43.8)	
>15: (%)	60 (9.5)	1 (0.9)	59 (11.5)	
Married or cohabitant, n (%)	270 (42.9)	38 (32.5)	232 (45.3)	0.014
Living with children, n (%)	248 (39.4)	30 (25.6)	218 (42.8)	0.003
Work participation, n (%)	370 (58.8)	49 (41.9)	321 (62.7)	<0.001
Alcohol use disorder lifetime, n (%)	73 (11.6)	29 (24.8)	44 (8.6)	<0.001
Drug use disorder lifetime, n (%)	165 (26.2)	81 (69.2)	84 (16.4)	<0.001
Inattentiveness, mean (SD)	27.4 (4.7)	27.9 (5.1)	27.3 (4.6)	0.036
Hyperactivity-Impulsivity, mean (SD)	23.9 (6.6)	26.7 (5.8)	23.3 (6.6)	<0.001
Emotional Dysregulation, mean (SD)	12.1 (5.6)	14.0 (5.6)	11.8 (5.5)	<0.001

P-values are due to comparison of ADHD patients with and without a history of criminal conviction (chi-square or t-test).

Table 2. Associations between ADHD symptom severity and emotional dysregulation as independent variables and criminal conviction as the outcome measure in a clinical sample of 629 adults with ADHD who were admitted to a psychiatric clinic specialized in examination of ADHD

	Unadjusted			Adjusted		
	OR	95%CI	p-value	OR	95%CI	p-value
Age (increase in 10 years)	1.34	1.13-1.60	0.001	1.32	1.10-1.59	0.003
Gender (Men v. Women)	2.44	1.58-7.77	<0.001	3.38	2.12-5.39	<0.001
ADHD symptom severity						
Inattentiveness	1.03	0.98-1.07	0.28	0.96	0.91-1.02	0.17
Hyperactivity-Impulsivity	1.09	1.05-1.12	<0.001	1.09	1.04-1.13	<0.001
Emotional dysregulation	1.08	1.04-1.12	<0.001	1.07	1.02-1.12	0.006