Attention deficit hyperactivity disorder and critical incidents in a Scottish prison population

Susan Young a,*, Gisli H. Gudjonsson a, June Wells b, Philip Asherson a, Delphine Theobald a, Brid Oliver a, Claire Scott c, Audrey Mooney d

a King's College London, Institute of Psychiatry, De Crespigny Park, London SE5 8AF, UK
b Department of Applied Social Sciences, The Robert Gordon University, Schoolhill, Aberdeen AB10 1FR, UK
c Department of Psychology, University of Aberdeen, Regent Walk, Aberdeen AB24 3FX, UK
d HMP Aberdeen, 4 Grampian Place, Aberdeen AB11 8FN, UK

Abstract

There is a well-documented association between ADHD symptoms and antisocial behaviour. The relationship between ADHD symptoms and critical incidents within a Scottish prison was investigated. A total of 198 serving prisoners were screened for both childhood and adult ADHD symptoms using the DSM-IV checklist of symptoms (DCS). Antisocial personality disorder (ASDP) was measured by the MCMI-III and used as a covariate. Behavioural problems in prison were determined using a measure of recorded critical incidents over a period of three months, including verbal and physical aggression, damage to property, self-injury, and severity of aggression. Functional impairment was determined by extreme number of critical incidents. Forty eight (24%) of the prisoners met DCS criteria for childhood ADHD, of whom 11 (23%) were fully symptomatic, 16 (33%) in partial remission and 21 (44%) in full remission. The 27 participants who were fully symptomatic or in partial remission of symptoms, had significantly more aggressive incidents and were more functionally impaired in terms of their behaviour than those participants who were symptom free, after controlling for ASDP. Symptomatic prisoners, including those in partial remission, engaged in extreme incidents in terms of both frequency and severity. It is important to identify and treat prisoners who remain symptomatic for ADHD.

Keywords:
ADHD symptoms
Antisocial personality disorder
Prison
Critical incidents
Management

1. Introduction

Several studies have reported an association between antisocial behaviour and adults with attention deficit hyperactive disorder (ADHD) (Babinski, Hartsough, & Lambert, 1999; Brassett-Grundy & Butler, 2004; Satterfield, Swanson, Schell, & Lee, 1994). Despite this, there have been only a few published studies investigating the prevalence of ADHD in adult prison populations and none have specifically explored the association of ADHD symptoms with behaviour in this restricted environment (Dalteg, Lindgren, & Levander, 1999; Eyestone & Howell, 1994; Gudjonsson, Sigurdsson, Einarsson, Bragason, & Newton, 2008; Rasmussen, Almvik, & Levander, 2001; Vitelli, 1995). These five studies suggest that approximately 50% of inmates had childhood ADHD and of those about half met full or partial remission criteria for ADHD in adulthood.

Fazel and Danesh (2002) found that when compared with the general population in America and the United Kingdom, prisoners had about a ten fold excess of antisocial personality disorder (ASPD). They found a prevalence rate of 65% for ASPD, which is similar to the 50–75% reported in studies carried out within the United States penal system (Singleton, Meltzer, Gatward, Coid, & Deasy, 1997). In addition to conduct problems in childhood and antisocial personality disorder in adulthood, substance misuse is strongly associated with adult ADHD, but this may only occur when there is co-morbid antisocial behaviour (Lynskey & Hall, 2001).

Children with ADHD are at risk of the development of psychiatric problems, conduct disorder, and antisocial personality disorder (Brassett-Grundy & Butler, 2004; Young, Gudjonsson, Ball, & Lam, 2003). In a meta-analysis of 20 studies, a strong relationship was found between ADHD measures and criminal/delinquent behaviour (Pratt, Cullen, Blevins, & Unnever, 2002). Lynam (1996) argues that children with ADHD, and who have conduct problems, are at a high risk of becoming psychopathic in adulthood and chronic offenders. The antisocial behaviour of people with ADHD seems to be mediated by poor behavioural control (Barkley, 1998), which suggests that they would be likely to display more critical
incidents within a prison environment. Indeed, their behavioural problems may become exacerbated once they are incarcerated in prison where deficits of behavioural control and cognitive function related to ADHD may result in an increased level of inconsistent and unacceptable behaviour (i.e. critical incidents, including verbal and physical aggression).

The principal aim of this study was to investigate whether partial, as well as full symptoms, are associated with behavioural problems in the prison after controlling for the effects of ASPD.

2. Method

2.1. Participants

A total of 198 male offenders incarcerated in Aberdeen prison responded to adverts placed in the prison and consented to take part in the study (mean age = 30.0, SD = 8.2). The ethnic background of the participants was known in 194 cases, of which 184 (95%) were white Europeans. The index offences were theft/burglary/deception (n = 63, 32%), assault/armed robbery (n = 50, 25%), traffic violations (n = 47, 24%), drugs (n = 23, 12%), arson (n = 3, 1%), sex (n = 2, 1%) and others (n = 10, 5%). On arrival at the prison, 182 (92%) participants had one or more previous convictions.

Aberdeen prison is located in the city of Aberdeen Council Area and is the local prison for the northeast of Scotland and Northern Isles. The prison's capacity is designed to house 154 prisoners, mostly male, but is often subjected to up to 50% overcrowding (Scottish Executive, 2004). The prison holds various categories of prisoners including males on remand (i.e. in prison awaiting trial), convicted and short-term sentenced prisoners, prisoners under the age of 21, some convicted long-term prisoners and, at the time of data collection, some females. Of the 198 offenders in the sample only six were on remand. Exclusion criteria included participants who were female, had not served at least three months for the current sentence, were mentally too unwell to participate as judged by the prison officers, and those who had participated in the study on a previous admission (i.e. they were re-admissions to the prison).

2.2. Measures


The DSM-IV checklist of symptoms (DCS, American Psychiatric Association, 1994) is an 18 item self-report questionnaire consisting of statements relating to symptoms of ADHD, and directly corresponds with DSM-IV criteria (American Psychiatric Association, 1994). Nine items relate to problems with inattention and nine items relate to problems with hyperactivity-impulsivity. In addition to categorizing frequency of symptoms, each item was scored on a 3-point rating scale (0, never; 1, sometimes and 2, often). Participants completed the questionnaire twice, once self-reporting on childhood symptoms and again reporting on symptoms in the last six months.

For the purpose of this study, childhood criteria for DSM-IV ADHD were applied using these data: six or more inattentive items (rated as 'often') or six or more hyperactive/impulsive items (rated as 'often'). ADHD in adulthood was classified into the following types: (1) ADHD/predominantly inattentive type (PIT) indicated by classification of childhood symptoms for ADHD plus current symptoms indicated by a score of six or more inattentive items (rated as 'often') on the DCS. (2) ADHD/predominantly impulsive/hyperactive type (PIH) indicated by classification of childhood symptoms for ADHD plus current symptoms indicated by a score of six or more hyperactive/hyperactive items (rated as 'often') on the DCS.

If there was no classification in childhood then there was no classification in adulthood. For those classified in childhood but who did not fulfill criteria for full symptomatic impairment in adulthood, we applied the following criteria for ADHD in partial and full remission: (1) ADHD in partial remission (IPR) indicated by a classification of ADHD in childhood, plus a total score of ≥17 for symptoms in the last six months on the DCS. A score of 17 represents one standard deviation above the mean score obtained by a normal population (Young, 1999) and (2) ADHD in full remission (IFR) indicated by a classification of ADHD in childhood, plus a total score of <17 for symptoms in the last six months on the DCS.

2.2.2. The Millon clinical multiaxial inventory-III (MCMI-III) (Millon 1997)

The MCMI-III is a 175-item true–false inventory comprising a total of 24 clinical scales derived from Millon's theory of personality, and paralleling DSM-III and DSM-IV axis I and II diagnostic categories. These include 11 basic personality scales, three pathological personality disorder scales representing greater levels of personality pathology, and ten clinical syndromes scales. The MCMI-III was chosen because it has a reliable and valid scale for measuring antisocial personality disorder (ASPD), which is of particular relevance to the present study. As recommended in the manual, a base rate score of 85 or higher was used as diagnostic screening of ASPD.

2.2.3. Critical incidents

Critical incidents were obtained from prison records completed by staff for the previous three-month period. They were classified as incidents of verbal aggression, physical aggression, damage to property, self-injurious, arson and 'other' behaviours and were recorded and allocated a score of one point per incident (regardless of type). The sum total represented the critical incident total score. This was based on a measure used in a previous study (Young et al., 2003). In addition, the severity of each physical aggression incident was rated by applying the following point system:

- No threat or physical violence.
- A threat of physical violence without injury being inflicted.
- Violence is inflicted but no injury is detectable on examination by a doctor and there is no significant pain.
- Significant pain, bruising or laceration.
- Any assault producing an injury that requires further hospital investigation (e.g. X-ray, staff being sent off duty).

2.2.4. Functional impairment

We were also interested in the rates of severe impairment in the ADHD and non-ADHD groups. For the purpose of this study we defined this as the presence of inappropriate and disruptive behaviour determined by the measure of critical incidents. Impairment was operationalised by selecting an arbitrary category of the top 10% of the entire sample for any one of the four domains of critical incidents (i.e. verbal aggression, physical assault, property damage and self-injury). If there was impairment in any one of these domains then a participant was recorded as impaired. With regard to verbal aggression this accounted for those participants who had ≥20 verbal incidents recorded, for physical aggression ≥2 incidents, for damage to property ≥2 incidents, and for self-injury ≥1 incident.
2.3. Procedure

Participants were recruited at a Scottish prison over a period of three years. All participants were given detailed information about the nature and purpose of the study and were able to discuss their participation with members of the prison staff. It was emphasised that their participation was voluntary and confidential and that their non-participation would not influence their length of imprisonment or their subsequent treatment or management in prison. Participants were told that they could take breaks during the session if they needed to do so, and were also told that they could discontinue their participation at any time. Written consent was gained from all participants. Research assistants who were primarily graduate psychologists collected the data. All research assistants were fully trained in the use, administration and scoring of the questionnaires. Participants were asked to complete the DSM-IV DCS twice: once for symptoms in childhood and again for symptoms in the past six months. Critical incidents were recorded for the period three months prior to each individual’s assessment. Socio-demographic information was collected from the participant’s files. Poor readers were given assistance but this did not include interpretation of test items or advice on how to answer the questions.

3. Results

3.1. Childhood symptoms of ADHD

The first question to be determined was an estimate of how many participants had childhood ADHD based on their self-report. Of the 198 participants, 48 (24%) of the sample had childhood symptoms that fulfilled symptom criteria for ADHD using the DSM-IV DCS data. Out of those 48, 27 (56%) were of the predominantly inattentive type, 8 (17%) were of the predominantly impulsive/hyperactive type and 13 (27%) were of the combined type. One hundred and fifty participants did not meet ADHD childhood criteria using the DSM-IV DCS and were classified as a Non-ADHD group.

3.2. Current ADHD symptoms

Eleven (23%) of the 48 participants identified as having childhood ADHD using the DSM-IV DCS, met the full DSM-IV DCS criteria for ADHD in adulthood. This represents 6% of the entire sample. Of those 11, five (45%) were of the predominantly inattentive type, four (36%) were of the predominantly impulsive/hyperactive type and two (18%) were of the combined type. In addition, a further 16 (33%), or 8% of the entire sample, met criteria for ADHD in partial remission, and 21 (44%) met criteria for a full remission. Therefore, 27 participants (56%), or 14% of the entire sample, were either fully symptomatic or in partial remission of their symptoms.

3.3. Antisocial personality disorder

Out of the 196 participants who had completed MCMI-III profiles, 85 (43.4%) met the criteria for ASPD. Of the 27 participants who were ADHD symptomatic, 17 (63%) had ASPD in contrast to 68 (40.2%) of the remaining participants. This difference is significant ($X^2 = 4.9, df = 1, p < 0.05$, odds ratio = 2.7).

3.4. Critical incidents

With regard to current ADHD symptoms, the fully symptomatic ($n = 11$) and those in partial remission of their symptoms ($n = 16$) were combined into one group, labelled Symptomatic Group ($n = 27$) and compared with the 171 other participants who either had no history of ADHD ($n = 150$) or were in full remission ($n = 21$). The mean scores, standard deviations, median, and range of scores for each type of critical incidents are shown for the two groups in Table 1.

Multivariate analysis of variance was performed on the six dependent variables in Table 1 to test for overall significant effects after taking into account the relationship between the dependent measures. ASPD screening diagnosis was used as a covariate in the analysis in order to control for the effects of ASPD on ADHD symptomatology and critical incidents. There was no significant overall effect for ASPD ($F(196) = 1.63, F = 5.01, p < .001$ and partial eta squared = 0.138). ADHD symptomatology had a significant effect on total critical incidents ($F(196) = 19.39, p < 0.001$ and partial eta squared = 0.091), severity of incidents ($F(196) = 14.92, p < .001$ and partial eta squared = 0.072); verbal aggression ($F(196) = 13.96, p < .001$ and partial eta squared = 0.067) and physical aggression ($F(196) = 14.99, p < .001$ and partial eta squared = 0.072).

3.5. DSM-IV DCS criteria and functional impairment

The top 10% of the entire sample for any one of the domains of critical incidents (i.e. verbal, physical, damage to property and self-injury) were determined and compared with the various classifications for DSM-IV DCS in this sample (presented in Table 2). Of the 198 participants in the sample, 60 (30%) displayed functional impairment according to the strict criteria for critical incidents. Using these strict criteria of impairment, there was a significant difference in the numbers showing impairment in the ADHD symptom groups and the non-symptom group. Of the 11 participants who met full criteria for ADHD in adulthood, 10 (91%) were impaired compared to nine (56%) of those in partial remission and

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Table 1

<table>
<thead>
<tr>
<th>Critical incidents</th>
<th>Non symptomatic group (n = 171)</th>
<th>Symptomatic group (n = 27)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean No. of Incidents</td>
<td>SD</td>
</tr>
<tr>
<td>Verbal aggression</td>
<td>5.05</td>
<td>1.12</td>
</tr>
<tr>
<td>Physical aggression</td>
<td>0.46</td>
<td>0.95</td>
</tr>
<tr>
<td>Damage to property</td>
<td>0.39</td>
<td>1.2</td>
</tr>
<tr>
<td>Self-injury</td>
<td>0.09</td>
<td>0.55</td>
</tr>
<tr>
<td>Total critical Incidents</td>
<td>6.41</td>
<td>13.9</td>
</tr>
<tr>
<td>Severity of aggression</td>
<td>0.68</td>
<td>1.5</td>
</tr>
</tbody>
</table>
four (19%) for this in full remission. The difference between these three groups was significant ($X^2 = 16.4, df = 2, p < 0.001$).

In order to investigate the effects of ASPD on the relationship between ADHD symptomatology and functional impairment, a sequential binomial logistic regression was conducted with ASPD diagnosis being entered in the first block and adding ADHD symptomatology in the second block. Table 3 shows that ADHD symptomatology is a much more powerful predictor of impairment than ASPD and it improved the overall classification from 69.1% to 76%. The odds ratios for ASPD and ADHD symptomatology in the final model were 2.06 and 8.31, respectively. The Nagelkerke $R^2$ value indicates that the final model explains approximately 20% of the variance in impairment.

4. Discussion

In summary, we found that 24% of the participants met the DSM-IV screening criteria for childhood ADHD, of whom 23% were found to fulfil full criteria for ADHD as adults, 33% were in partial remission and 44% were in full remission. The rates of persistence are similar to those reported in the meta-analysis of follow-up studies that applied DSM criteria (Faraone, Biederman, & Mick, 2006), but lower than some previous reports using a slightly different methodology. For example, Rasmussen, Almvik, and Levander (2001) reported 30% being fully symptomatic using the Brown ADD scale and Dalteg et al. (1999) reported 25% using the Wender-Utah rating scale. The discrepancy might be accounted for by differences in the measures used and the criterion applied for defining the diagnostic group. Furthermore, the DSM-IV and earlier versions do not allow for developmental changes in symptom definitions of the diagnostic group. Furthermore, the DSM-IV and earlier versions do not allow for developmental changes in symptom definitions of the diagnostic group. Furthermore, the DSM-IV and earlier versions do not allow for developmental changes in symptom definitions of the diagnostic group.

One important limitation in this study, which is common among all the previous prison studies, is that the ADHD groups were determined using self-reported rating scales to screen for the likelihood of ADHD, one of which was used to retrospectively recall childhood symptoms and which therefore may not have been reliable (Mannuzza, Klein, Klein, Bessler, & Shroot, 2002). When used alone, rating scales are insufficient to ‘diagnose’ ADHD. Another limitation is that we do not have a record of the number of participants who did not respond to the adverts placed in the prison. As a consequence, the participants may not be entirely representative of the prison population as a whole.

The findings in relation to critical incidents, which were independently rated by prison staff, are clear and significant. The participants who were symptomatic for ADHD, either fully symptomatic or in partial remission, were significantly more likely to be involved in a range of critical incidents within the prison during the previous three months (i.e. verbal and physical aggression, total number of incidents regardless of type, and the severity of the aggressive incidents). These findings remained highly significant after controlling for ASPD. The findings corroborate those found in secure hospital settings (Young et al., 2003). It suggests that one of the factors driving behavioural problems within the prison environment is the current level of ADHD symptoms. The findings also show that the more severe the current level of ADHD symptoms, the more common and severe are the behavioural problems in this population.

A measure of functional impairment was obtained by classifying the top 10% of critical incidents in each group (the top 10% was chosen, because it represented an extreme score in each of the incident categories, whilst at the same time allowing for sufficient number of incidents in each category to be satisfactorily classified). This indicated that the proportion of the DSM-IV adult ADHD groups showing the highest levels of impairment decreased as symptoms remit. Those in full remission had a rate of impairment similar to those who had no history of ADHD. This shows a strong association between ADHD in adulthood and levels of impairment within the prison setting, with persistence of symptoms leading to high levels of functional impairment and low symptoms leading to relatively low levels of impairment. The logistic regression analyses, which controlled for the effects of ASPD, showed that the current level of ADHD symptoms is a much better predictor of functional impairment than ASPD (i.e. odds ratios of 8.31 and 2.06, respectively). The final regression model explained 20% of the variance in impairment, about two-thirds of which was explained by ADHD symptoms and one-third by ASPD.

A major strength of the study is the inclusion of a measure of functional impairment within the prison setting, which clearly indicates the potential risk that adults with significant levels of ADHD symptoms pose, and their associated management needs and cost implications. These data suggest that it is important that prison inmates undergo screening for ADHD, to identify those who would benefit from a comprehensive multidisciplinary assessment to determine who may have ADHD, whether presenting as the full blown disorder or in partial remission. Poor behavioural control and the risk of critical incidents within the prison setting may be reduced in some cases by treatment with pharmacotherapy as this plays a major role in the treatment of ADHD in adults (Nutt et al., 2007). In addition to improving the core symptoms of ADHD, it is increasingly being recognised that poor regulation of mood (mood instability or lability) is commonly associated with ADHD (Asherson, 2005) and this may also respond to medication in the same timeframe as core ADHD symptoms (Reimherr et al., 2005).

However, it will be necessary to provide psychological treatment, as medication may reduce symptoms but is unlikely to change life-long patterns of poor behavioural control and antisocial behaviour. Specific rehabilitation programmes for offenders with ADHD are now available, which will benefit individuals with a history of ADHD regardless of current symptom status (Young & Ross, 2007). For those who need it, treatment with medication is likely to predispose individuals to better engage and succeed in such programmes (Young & Bramham, 2007).

The study has some limitations. First, these findings applied to one prison in Scotland and therefore are not necessarily generalisable to other prison settings and other countries. Further research is needed in other prisons in the UK and internationally to determine the prevalence of ADHD in other prison settings. There were no measures of oppositional defiant disorder or conduct disorder in childhood available so we were unable to control for this. Instead we measured ASPD and controlled for this in our analyses. In view of the significant relationship between conduct disorder and adult ASPD (Lynam, 1996) this was a reasonable compromise. Further studies would ideally include additional information relating to a history of conduct disorder.

| Table 3 | Summary of the logistic regression for MCMII-III antisocial personality disorder (ASPD) and ADHD current symptomatology in predicting functional impairment. |
|---|---|---|---|---|---|---|
| Explanatory variables | B (S.E.) | Wald | Exp (B) | CI (95%) |
| **Block 1** | | | | |
| ASPD | 0.88 (0.32) | 7.7* | 2.4 | 1.3–4.5 |
| Over all classification 69.4% |
| **Block 2** | | | | |
| ASPD | 0.72 (0.33) | 4.57* | 2.1 | 1.06–4.01 |
| ADHD current symptomatology | 2.2 (0.48) | 19.36** | 8.3 | 3.22–21.4 |
| Block 2 statistics: $R^2 = 0.20$ (Nagelkerke). Block Chi² = 22.3**. Model Chi² = 30.2**. |
| Over all classification 76.0% |

\[ p < 0.05. \]
\[ \text{**} p < 0.001. \]
The minimal effects of ASPD on the relationship between ADHD current symptoms raises important questions about other co-morbid factors that could mediate or moderate the relationship between ADHD symptomatology and critical incidents within institutional settings. Recent research points to such factors as impulsivity and emotional instability (Eisenbarth et al., 2008; Gudjonsson, Sigurdsson, Young, Newton, & Peersen, submitted for publication), which may impair behavioural control in a stressful and confined environment.

In summary, the present study indicates that around one-quarter of prison inmates report childhood symptoms of ADHD and that those who remain symptomatic (irrespective of remitting symptoms) show a high level of functional impairment within the prison environment compared to other inmates. The findings highlight the treatment needs not only of those who may be fully symptomatic but also of those who may be in partial remission of their symptoms. This vulnerability has been reported previously and is likely to be of considerable concern to prison staff in respect to their management (Young, 2007; Young et al., 2003). It should not be ignored that ADHD individuals have unmet needs which present serious cost implications for society. In our view it is imperative that these individuals are properly identified and provided with appropriate treatment.

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