

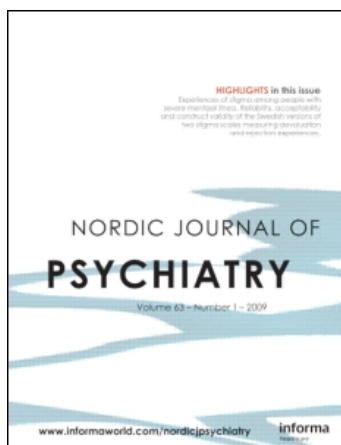
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Screening for attention-deficit hyperactivity disorder and co-morbid mental disorders among prison inmates

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Attention-deficit hyperactivity disorder (ADHD) is a developmental disorder, which is associated with a number of psychiatric conditions, mostly personality disorder, substance misuse, anxiety and depression. The aim of the present study was to investigate the relationship between ADHD symptoms and associated psychiatric conditions among prisoners. The participants were 90 male prisoners in Iceland who were assessed within 10 days of admission to the prison. The Mini International Neuropsychiatric Interview (MINI) and the Standardised Assessment of Personality-Abbreviated Scale (SAPAS) were administered. Childhood ADHD symptoms were screened by the Wender–Utah Rating Scale and current adult symptoms by the DSM-IV Checklist for ADHD. Half of the prisoners (50%) were found on screening to have met criteria for ADHD in childhood and of those over half (60%) were either fully symptomatic or in partial remission of their symptoms. A logistic regression analysis revealed that the MINI Antisocial Personality Disorder scale was the single best predictor of current ADHD symptoms. Many prisoners are either fully symptomatic or in partial remission of their ADHD symptoms and have serious co-morbid problems, primarily associated with antisocial personality disorder and substance dependence. Prisoners should routinely undergo screening for ADHD in order to identify those who would benefit from a comprehensive assessment to determine who may have ADHD and associated problems.

• *ADHD, Antisocial personality disorder, Prisoners, Psychiatric disorder, Substance misuse.*

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Attention-deficit hyperactivity disorder (ADHD) is a developmental disorder, which is typically associated with childhood. Individuals with ADHD often have difficulties in sustaining attention to a certain task, have an extensive or inappropriate level of motor activity and have problems in inhibiting their behaviour (1–3). The core symptoms are inattention, hyperactivity and impulsivity (4). The prevalence of ADHD among children has been the subject of numerous epidemiological studies. Despite some controversies and different prevalence rates, it is estimated that the disorder affects 3–7% of school-age children (4).

It is increasingly recognized that the symptoms of ADHD often persist into adulthood. For example, a 30-year prospective longitudinal study (5) found a prevalence rate of 7.4% of ADHD at age 10, which was at follow-up significantly associated with “a wide

range of negative outcomes in adulthood, typical of social exclusion, spanning life domains of education, economic status, housing, relationships, crime and health . . .” (p. 12). Other studies indicate that 50–65% of children with ADHD have serious problems related to their ADHD symptoms in adulthood (cited in study 6). These problems can manifest themselves in social relationships, depression, low self-esteem, antisocial behaviour, drug use and disadvantages in relation to education and occupation (6).

A number of studies have followed ADHD children into adulthood to ascertain the persistence of ADHD symptoms. A national co-morbidity survey that assessed childhood and adult ADHD among 3119 participants with the age range of 18–44, showed that 36% of the participants who were diagnosed as having had ADHD in childhood met the diagnostic criteria for ADHD as

adults (7), although many more retain residual symptoms and are in partial remission (8).

Around half of children with ADHD will have comorbid conduct disorder (9). Studies of young children have shown that externalising problems (e.g. hyperactivity and/or impulsivity) predict antisocial behaviour and adult convictions in later life (10, 11). Prospective studies into ADHD in childhood have reported antisocial personality disorder at follow-up in adulthood (5, 10, 12–15). One study showed that a high proportion (78%) of adult offenders with a primary diagnosis of personality disorder, incarcerated in secure services, reported childhood ADHD symptoms (16). Substance misuse only appears to be associated with adult ADHD when there is co-morbid antisocial behaviour (17). A follow-up research (18), where 85 boys with the average age of 7.3 were clinically diagnosed as having ADHD were followed up and reassessed at the average age of 24.1 years, indicated that in adulthood the ADHD boys were more likely to have antisocial personality disorder and substance abuse than a comparison group. Anxiety and depression are also common co-morbid problems in adults with ADHD (5).

In spite of the fact that several studies have reported an association between antisocial behaviour and adults with ADHD, few studies have explored the prevalence of adults with ADHD in prisons. Nine studies have investigated the prevalence of ADHD among adult prison inmates (19–27). These studies use different methodologies in assessing childhood and adult ADHD symptoms. However, the results from these studies indicate that childhood ADHD among adult prison inmates ranges from 31% to 67% and adult ADHD ranges from 24% to 45%. These numbers clearly indicate that ADHD is more common among offenders than the general public, highlighting the role of personality disorder, which requires further investigation.

Aims

The primary aim of the present study was to investigate the relationship between ADHD and psychiatric disorders among Icelandic prisoners. We hypothesized that those prisoners who are ADHD symptomatic are more likely than the other prisoners to have a psychiatric diagnosis relating to anxiety, depression, social phobia, substance misuse and personality disorder. We further hypothesized that it is personality disorder that best discriminates between the ADHD and non-ADHD groups.

Materials and Methods

Participants

One hundred and six Icelandic prison inmates were asked to participate in this study. Six (6%) refused to participate, four (4%) did not complete all the questionnaires

and six (6%) female inmates were excluded from the study. The mean age of the remaining 90 male inmates was 31 years (standard deviation, $s=9.8$), ranging between 19 and 56 years. They were all Icelandic (Caucasian) and were mainly serving sentences for property offences (52%), traffic violations (42%), drug offences (28%), violent offences (17%) and sex offences (7%). The percentages total is more than 100% because some of the inmates were serving consecutive sentences for a number of offences and only the main or the most serious offence was reported. The majority or 74 (82%) of the prisoners had finished compulsory education, which is at 16 years in Iceland. Years of education ranged from 7 to 19 years with an average of 11.6 years ($s=2.4$).

Materials

WENDER UTAH RATING SCALE (WURS; 28)

This is a self-report instrument intended for retrospective assessment of ADHD symptoms in childhood. Originally, the scale consisted of 61 items about medical health and problem behaviour in childhood but usually only the 25 items that show the greatest mean difference between ADHD patients and non-ADHD patients are used (28). Only these 25 items were used in the present study.

In filling out the WURS, adult participants are asked to rate statements about problems or symptoms of ADHD in childhood on a 5-point scale which ranges from “not at all or very slightly” to “very much”. The items are scored from 0–4 and give the maximum score of 100.

Research (28) indicates that a cut-off score of 46 or higher correctly identifies 86% of adults with childhood ADHD and 99% of normal subjects. The internal reliability of the list was 0.90 and the validity of the WURS was also established by correlations with parent ratings and predictions of treatment outcomes (responses to drug treatment).

DIAGNOSTIC STATISTICAL MANUAL-IV CHECKLIST OF ADHD SYMPTOMS (DSM-IV ADHD CHECKLIST; 4)

This is an 18-item self-report statement list of inattention, hyperactivity and impulsivity symptoms, which corresponds to the DSM-IV diagnostic criteria of ADHD (4). Nine of the items relate to problems of hyperactivity or impulsiveness and nine to problems of inattentiveness. Each item is rated on a 3-point scale, “never” = 0, “sometimes” = 1 and “often” = 2. For a detection of an item, a rating of 2 was necessary.

In the present study, ADHD diagnosis (i.e. being fully symptomatic) required the reporting of six or more of the hyperactivity/impulsiveness symptoms and six or more of the inattentiveness symptoms as having been present the previous six months.

Only those who obtained a diagnosis of ADHD in childhood on the WURS could fulfil criteria for adult ADHD on the DSM-IV (i.e. if there was no classification in childhood then there can be no classification in adulthood).

The participants were also classified if they were in partial remission of their symptoms, using the recommended cut-off score of 17 (29), which represents one standard deviation above a mean score for a non-control group.

MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW 5.0.0 (MINI; 30, 31)

This is a structured diagnostic interview, which assesses the presence of the 19 most common DSM-IV and ICD-10 disorders, 17 Axis I disorders, one Axis II disorder (antisocial personality disorder) and suicidal ideation/ attempts. The interview contains 120 questions answered with either "yes" or "no".

The MINI was originally developed to give a psychiatric diagnosis according to both the DSM-III-R and the ICD-10, but recently it was updated according to the DSM-IV. The interview was developed to meet the increasing demand for a short, reliable and valid diagnostic tool. It was intended to replace older, time-consuming and structured psychiatric interviews, such as the CIDI and the SCID (30–32). The interview combines the qualities of a detailed psychiatric interview and a short screening instrument (31).

The main aim of the MINI is to give a diagnosis of current symptoms of mental disorders, but it also provides past and lifetime diagnoses where it is clinically relevant for the current diagnosis (e.g. for Major Depression and Manic Episodes, as well as a lifetime diagnosis for Psychotic Disorders and Antisocial Personality Disorder). The MINI is divided into diagnostic sections by disorders and gives one or two screening questions (except for psychotic disorders) for each disorder. A negative answer rules out a diagnosis but a positive answer requires further questioning. The criteria for each disorder are placed at the end of each section so that a diagnosis can be given during or immediately after the interview (30, 31).

The MINI has been shown to have good inter-rater and test-retest reliabilities and good correlations with both the SCID and the CIDI (kappa over 0.70 for most of the psychiatric diagnoses; 30–33).

STANDARDISED ASSESSMENT OF PERSONALITY-ABBREVIATED SCALE (SAPAS; 34)

This is a brief and a simple screening interview for personality disorders. The scale consists of eight questions from the Standardised Assessment of Personality (SAP) interview, which is a detailed assessment of personality disorders and gives diagnoses according to

the DSM-IV and the ICD-10. The Scale's questions are answered with either "yes" or "no" and the items are scored with either "0" or "1" so total scores range between 0 and 8.

Research has shown that the SAPAS is an effective tool for identifying the presence of personality disorder and that a cut-off score of 3 identifies correctly the presence of personality disorder, regardless of type, according to the DSM-IV criteria in nine cases out of 10 (34).

Procedure

The prison inmates were approached by a prison officer within the first few days of their imprisonment and informed about the research. If they agreed to participate, they were interviewed individually during the first 10 days of imprisonment by one of the researchers after having signed an informed consent. Their answers were anonymous and confidential.

Two of the researchers (Ms Newton and Mr Bragason) conducted all the interviews. Both of them are qualified psychologists and both had received training in administering the MINI.

The study was approved by the National Bioethics Committee, the Icelandic Data Protection Authority, and the Prison and Probation Administration.

Results

ADHD classification

The total mean score on the WURS was 48.4 ($s=21.9$), ranging from 4 to 99 (see reference 21 for detailed information on their ADHD symptoms). Forty-five (50%) of the prison inmates met the WURS criteria of childhood ADHD, i.e. they received a score of 46 or higher on the WURS. Of these 45 inmates, according to the DSM-IV Checklist, 18 (40%) were in full remission of ADHD symptoms and 27 (60%) were presently symptomatic as adults. Of the 27 symptomatic participants, 14 (15%) were fully symptomatic and 13 (14%) were in partial remission of their symptoms (i.e. a score of 17 or more on the DSM-IV Checklist). Those who were in the symptomatic or full ADHD groups were fulfilling criteria for either inattention or hyperactivity/impulsivity or both as adults.

No significant differences were found between the symptomatic and non-symptomatic groups regarding age of first conviction and number of previous prison sentences received.

Relationship of ADHD with mental disorders

Table 1 gives the number of participants in the ADHD symptomatic ($n=27$) and non-symptomatic ($n=63$) groups who met criteria for each of the disorders in

Table 1. The number of participants in the attention-deficit hyperactivity disorder (ADHD) symptomatic ($n=27$) and non-symptomatic ($n=63$) groups who meet criteria for each of the disorders in the Mini International Neuropsychiatric Interview (MINI) and the Standardised Assessment of Personality-Abbreviated Scale (SAPAS).

| Explanatory variables | Total sample, <i>n</i> (%) | ADHD symptomatic, <i>n</i> (%) | Non-ADHD symptomatic, <i>n</i> (%) | Chi ² (df=1) |
|---|-------------------------------|-----------------------------------|---------------------------------------|----------------------------|
| Major Depressive Episode—Current (2 weeks) | 19 (21) | 9 (33) | 10 (16) | 2.49 |
| Major Depressive Episode—recurrent | 11 (12) | 7 (26) | 4 (6) | 5.05* |
| Dysthymia—current (past 2 years) | 8 (9) | 4 (15) | 4 (6) | 0.79 |
| Suicidality—Current (Past month) | 48 (53) | 18 (67) | 30 (48) | 2.04 |
| Manic Episode—current | 0 (0) | 0 (0) | 0 (0) | 0.00 |
| Manic Episode—past | 9 (10) | 6 (22) | 3 (5) | 4.61* |
| Hypomanic Episode—current | 2 (2) | 1 (5) | 1 (2) | 0.00 |
| Hypomanic Episode—past | 9 (10) | 5 (19) | 4 (7) | 2.02 |
| Panic Disorder without Agoraphobia—current (past month) | 1 (1) | 0 (0) | 1 (2) | 0.00 |
| Panic Disorder with Agoraphobia—current (past month) | 2 (2) | 0 (0) | 2 (3) | 0.02 |
| Agoraphobia without history of Panic Disorder—current | 0 (0) | 0 (0) | 0 (0) | 0.00 |
| Social Phobia—Current (Past month) | 14 (16) | 8 (30) | 6 (10) | 4.39* |
| Obsessive-Compulsive Disorder—current (past month) | 4 (4) | 3 (11) | 1 (2) | 2.11 |
| Posttraumatic Stress Disorder—current (past month) | 4 (4) | 4 (15) | 0 (0) | 6.59* |
| Alcohol Dependence—past 12 months | 46 (51) | 16 (59) | 30 (48) | 0.61 |
| Alcohol Abuse—past 12 months | 2 (2) | 0 (0) | 2 (6) | 0.00 |
| Substance Dependence—Past 12 months | 55 (61) | 22 (82) | 33 (52) | 5.57* |
| Substance Abuse—past 12 months | 1 (1) | 0 (0) | 1 (3) | 0.00 |
| Psychotic Disorders—lifetime | 11 (12) | 4 (15) | 7 (11) | 0.20 |
| Psychotic Disorders—current | 8 (9) | 3 (11) | 5 (8) | 0.01 |
| Anorexia Nervosa—current (past 3 months) | 0 (0) | 0 (0) | 0 (0) | 0.00 |
| Bulimia Nervosa—current (past 3 months) | 0 (0) | 0 (0) | 0 (0) | 0.00 |
| Generalized Anxiety Disorder—Current (Past 6 months) | 24 (27) | 11 (41) | 13 (21) | 2.95 |
| Antisocial Personality Disorder—Lifetime | 52 (58) | 23 (85) | 29 (46) | 10.33** |
| SAPAS† | 47 (52) | 19 (70) | 28 (45) | 3.84* |

* $P < 0.05$, *** $P < 0.001$. †A cut-off score of 3 was used to identify the presence of personality disorder (34).

the MINI and the SAPAS. The seven most common disorders across the two groups on the MINI were Substance Dependence (61%), Antisocial Personality Disorder (58%), Suicidality (53%), Alcohol Dependence (51%), Generalized Anxiety Disorder (27%), Major Depressive Episode (21%) and Social Phobia (16). Forty-seven (52%) met the criteria for personality disorder on the SAPAS.

Nearly all of the ADHD symptomatic inmates ($n=26$; 96%) met the criteria for at least one mental disorder according to the MINI and 50 (79%) of those who were not symptomatic. This difference is statistically significant ($\chi^2=4.13$, $P < 0.05$). Forty (89%) of those who met the WURS criteria of childhood ADHD and 36 (80%) of those who did not meet the childhood criteria also met the criteria of at least one mental disorder according to the MINI. This difference is not significant.

In order to investigate which of the seven variables highlighted in Table 1 were most influential in predicting ADHD symptomatology in adulthood, a logistic regression analysis were performed. The outcome variable was

whether the participant met the criteria for being symptomatic on the DSM-IV Checklist (i.e. either fully symptomatic or in partial remission). A forward stepwise method ("forward likelihood ratio") was used to enter the data (35). Five of the variables—Major Depressive Episode (current—two weeks), Suicidality (current—past month), Social Phobia (current), Substance Dependence (current) and Generalized Anxiety (current)—were entered in Block 1, in order to control for their influence. In Block 2, the remaining two measures were added, i.e. the MINI Antisocial Personality Disorder (lifetime) and the SAPAS. Of the seven variables entered into the analysis, only Antisocial Personality Disorder made a significant contribution to the model. The results of the logistics regression are presented in Table 2. The final model suggest that the odds of an inmate meeting ADHD symptomatic criteria was four times greater if the inmate met the diagnostic criteria of Antisocial Personality Disorder according to the MINI [Wald 4.49 ($P < 0.05$), Odds Ratio = 4.08, 95% CI 1.11–14.95]. Overall correct classification was 71.9%.

Table 2. Results of the logistic regression with the presence or absence of attention-deficit hyperactivity disorder (ADHD) symptoms as the outcome measure.

| Explanatory variables | <i>B</i> (SE) | Wald | Exp (<i>B</i>) | 95% CI |
|--|---------------|-------|------------------|------------|
| Block 1 | | | | |
| Substance Dependence—current | 1.38 (0.57) | 5.89* | 3.99 | 1.31–12.20 |
| Social Phobia—current | 1.32 (0.63) | 4.37* | 3.74 | 1.09–12.85 |
| Block 1 statistics: $R^2=0.13$ (Cox & Snell), 0.18 (Nagelkerke). Model $\chi^2=11.99^{**}$. Overall classification 71.9% | | | | |
| Block 2 | | | | |
| Substance Dependence—current | 0.85 (0.63) | 1.83 | 2.34 | 0.68–8.02 |
| Social Phobia—current | 0.89 (0.65) | 1.86 | 2.43 | 0.68–8.74 |
| Antisocial Personality Disorder—lifetime | 1.41 (0.66) | 4.49* | 4.08 | 1.11–14.95 |
| Block 2 statistics: $R^2=0.17$ (Cox & Snell), 0.25 (Nagelkerke). Model $\chi^2=17.00^{***}$. Overall classification 71.9% | | | | |

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Discussion

The rate of childhood ADHD and the rate of full and in partial remission symptoms in adulthood are similar in the present study to those reported in the literature among prison inmates in the USA (20), Canada (26), Sweden (19) and Norway (23). Over half (60%) of those with childhood ADHD in the present study were either fully symptomatic or in partial remission of their symptoms at the time of the study. Many prisoners may therefore continue to experience significant adjustment problems (8), which increases the likelihood of their continuing their offending (9) and exhibiting major behavioural and management problems within prison (36).

The findings in the present study show that psychiatric morbidity is very common among prisoners. This is consistent with research conducted among prisoners in other countries. For example, it was found that when compared with the general population of similar age in both America and the UK, prisoners had between a two- and fourfold excess of psychotic illnesses and about a 10-fold excess of anti-social personality disorder (37). The prevalence rates for antisocial personality disorder found in this review (37) was 65%, which was broadly in line with the 50–75% reported in studies carried out within the US penal system (38). This is consistent with the rate of 58% for antisocial personality disorder found on the MINI in the present study.

The main diagnoses in the present study in descending order were substance dependence, antisocial personality disorder, suicidal ideation, alcohol dependence, generalized anxiety disorder and major depressive disorder. These psychiatric conditions are very common among the prisoners and suggest a high rate of psychiatric comorbidity.

The ADHD symptomatic group was significantly more likely than the other prisoners to meet at least one of the diagnostic criteria on the MINI. Indeed, 96% of the ADHD symptomatic group met the criteria for at

least one mental disorder in contrast to 79% of those who were not symptomatic. Antisocial personality disorder was the single most powerful predictor of meeting criteria of full or partial symptoms of adult ADHD and in fact proved to be the only remaining predictor in the logistic regression after the interactions among the predictor variables had been explored. The lack of impact of substance dependence in the model may have been because substance misuse only appears to be associated with adult ADHD when there is comorbid antisocial behaviour (17). This suggests that what drives the offending behaviour of people with ADHD is their antisocial personality disorder.

The Antisocial Personality Disorder scale on the MINI was a superior predictor to the SAPAS in differentiating between the ADHD and non-ADHD symptom groups. The reason may be that whereas the MINI focuses on antisocial personality disorder, which seems the most common personality disorder among people with ADHD, the SAPAS identifies the presence of personality disorder, regardless of type.

Limitations

The present study has two main limitations. First, only male prisoners were included in the study because of the small number of female prisoners in Iceland. The prison population in Iceland is among the lowest per capita in Europe and has been around 40 per 100,000 inhabitants during the last years and the average daily number of prison inmates ranges between 120 and 140 (39). The second limitation is that the results are based on screening of ADHD among the prison inmates and not proper psychiatric and psychological diagnoses. In spite of these limitations, the present findings add valuable information on the relationship between antisocial personality disorder and ADHD among offenders serving prison sentences. Future research on this topic should have more detailed diagnostic instruments such as a semi-structured ADHD interview. Future research

could also focus on the role of childhood conduct disorder as a mediating variable between ADHD and antisocial personality disorder.

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