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Prevalence of Adult ADHD in an all Female Prison Unit

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Running heading: ADHD in Female Prisoners

**Abstract**

There is increasing evidence suggesting a link between ADHD and criminality, including a strong association between ADHD symptoms and the likelihood of being on probation or in prison. Most studies investigating the prevalence of ADHD in prison populations have focused on adult male offenders. In the current study, 69 female prisoners were screened for both childhood and adult ADHD symptoms using the Barkley Adult ADHD Rating Scale – IV (BAARS-IV). The results indicate that 41% of the prisoners met the diagnostic criteria for ADHD in childhood, and continued to meet criteria for ADHD as adults. More importantly young female prisoners (aged 18-25) were significantly more likely to report symptoms of ADHD than older prisoners. Prisoners who reported symptoms of ADHD also reported high levels of impairment associated with these symptoms. A better understanding of the prevalence of ADHD in female prison units can highlight specific areas for

intervention during rehabilitation, as well as the management of serious incidents within prison.

Keywords: ADHD; adult; female; prison; forensic

**Prevalence of Adult ADHD in an all Female Prison Unit**

Longitudinal studies have shown that ADHD is strongly associated with criminality in adolescence and adulthood (Mannuzza et al. 1989; Mannuzza et al. 2008; Satterfield and Schell 1997). Satterfield and Schell (1997) reported that hyperactive boys, with childhood conduct problems, had higher rates of arrest during adolescence (46%) and adulthood (21%) than controls. In addition, Mannuzza et al. (2008) demonstrated a similar increased risk of arrest, conviction and incarceration in adulthood for boys who had ADHD and no conduct problems than non-ADHD controls. Furthermore, individuals with ADHD come into contact with the criminal justice system at a higher rate than the general population (Goldstein 1997). Follow-up studies looking at lifetime criminality in boys with ADHD, have found that individuals with ADHD were more likely to be arrested, incarcerated and convicted in comparison to their non-ADHD counterparts (Mannuzza et al. 2008). Mannuzza and colleagues also found that participants with ADHD engaged in more aggressive and violent offences. Symptoms of ADHD, such as poor self control, increased risk-taking behaviours, confrontational interpersonal styles and impulsive behaviours, may also increase the likelihood of criminal charges associated with anti-social behavior and of assault or criminal damage (Asherson 2005).

Research conducted within prison settings has found significantly increased prevalence rates of ADHD among inmates when compared to non-delinquent controls (Ginsberg et al. 2010; Rösler et al. 2004). Moreover, ADHD symptomatology has been linked to critical incidents within prison settings (Young et al. 2009), with symptomatic prisoners likely to engage in a greater frequency and more severe incidents. A substantial body of research has addressed the relationship between ADHD, anti-social behaviour, and aggression in male offenders; however, relatively

few studies have investigated the rates of ADHD in female offenders and many have specifically excluded women from their sample (Young et al. 2011).

Studies conducted in the USA have highlighted prevalence rates of ADHD in female offenders ranging from 14.3% to 46%. In a large sample of men and women prisoners, Cahill et al. (2012) reported an overall prevalence of ADHD of 10.5%, with more females (15.1%) reporting symptoms on a Diagnostic and Statistical Manual of mental disorders-5<sup>th</sup> edition (DSM-IV; APA 1994) aligned self-report questionnaire than males (9.8%). Gunter et al. (2008) reported similar rates of ADHD following clinical diagnostic interviews with male and female prisoners; 14.3% of women met criteria for lifetime and current ADHD. Hennessey et al. (2010) reported a greater prevalence of ADHD when female prisoners retrospectively self-rated childhood symptoms. The 45.8% of female prisoners who met criteria for childhood ADHD also reported greater impairment than those who did not meet criteria, for example, less likely to have completed high school, more likely to report having been homeless and to smoke and use drugs.

European studies of female prisoners have reported a similar range in prevalence rates of ADHD; two studies employing self-report measures of ADHD symptoms reported prevalence of 10% (Rösler et al 2009) and 50% (Edvinsson et al. 2010). Edvinsson et al compared a female prison sample with a general population and psychiatric out-patient samples; there was an increasing incidence of ADHD symptoms across the samples, with the inmate sample reporting the greatest. Those with symptoms of ADHD also reported higher levels of difficulties and suffering associated with ADHD than a matched non-ADHD control group. In the study of female prisoners, Rösler et al (2009) reported that 24.5% met criteria for lifetime ADHD, and 10% with persisting ADHD. In addition, Rösler et al split the sample

according to age; younger adults (under 25years) reported the greatest rates of ADHD, with rates reducing with age (26-45 and 45+years).

As the field of research in this area is in its infancy, screening methods for ADHD have more commonly been used, than full diagnostic assessments. The majority of research that has assessed symptoms of ADHD in female prison samples has utilised self-report measures; therefore suffer from the pitfalls of subjective ratings. However, Gunter et al (2008) employed clinical interview and reported rates of ADHD similar to that found in self-reported screening studies. The variability in prevalence rates between studies may be indicative of specific judicial practices unique to the home country, which could affect the likelihood of females with ADHD reaching the prison system. In this sense, it is important to begin to develop a perspective of the incidence of ADHD in female offenders in different countries. To date there has been a lack of research in the UK. The present study aimed to address this gap by investigating the prevalence of ADHD in a UK All Female Closed Prison population. Female prisoners were screened for ADHD based on retrospective reports of symptoms and impairment in childhood and reports of current symptoms and impairment. In line with previous research, a higher rate of ADHD prevalence was hypothesised for female prisoners compared to the general population. Furthermore, it was predicted that those prisoners who screened positive for ADHD would also report greater childhood and current functional impairment.

## **Method**

### *Participants and procedure*

The current study conformed to ethical standards, with all participants providing informed consent and given information regarding their right to withdraw at anytime. A convenience sample that consisted of all seventy-nine women entering Newhall

Secure Female Prison, Yorkshire, over a 6-month period, were invited to participate in the study. The secure prison holds adult female prisoners of all categories and young offenders and juvenile delinquents on detention and training orders. In addition, the prison holds a small population of first stage life sentenced prisoners and foreign national prisoners. At the time of the study, the estimated population of the prison was 446. The prison had an estimated 1,000 serious incidents reported in 2005 (HMP 2006) and these remain a key concern. The participants were either in breach of their bail, on remand or had been convicted. Details on type and degree of offence were not collected. Prisoners who were deemed too unwell or distressed by the Prison Nurse or the Researcher were excluded. In addition, women who did not have a sufficient command of the English language were excluded. The screening was part of an initiative of the Newhall Secure Female Prison, Yorkshire to understand the prevalence of ADHD in their population and was introduced as part of their normal prisoner screening process. A clinician provided support with the completion of the measures when participants had difficulty reading, and to ensure that items were given due consideration.

Of the 79 women invited to participate, 7 (9%) declined, 2 (3%) were deemed too unwell and 1 (1%) had a limited understanding of English. A total of 69 female offenders, aged between 18-45 years, participated in the study. Participants denied any previous diagnosis of ADHD.

### *Measures*

Participants reported their experience of current (in the past 6 months) and childhood (aged 7-12 years) ADHD symptoms using a subset of items from the self-report Barkley Current and Childhood Symptoms Scales (Barkley 1998; Barkley 2011). Participants rated the frequency of eighteen symptoms (nine inattentive items, nine

hyperactive/impulsive items), based on DSM-IV criteria (APA 1994), on a 4-point Likert Scale (0 = never or rarely, 1 = sometimes, 2 = often, and 3 = very often).

Participants were classified as screening positive for childhood ADHD if six or more symptoms were rated 'often' or 'very often' in either domain on the childhood scale.

Adult (current) ADHD was classified as present if participants screened positive for childhood ADHD, and rated five or more ADHD symptoms as 'often' or 'very often' in either domain on the current ADHD symptom rating scales (in accordance with DSM-V criteria; (Diagnostic and statistical manual of mental disorders (5th ed.) 2013).

Functional impairment attributed to symptoms of ADHD, highlighted in the first part of the questionnaire, was also assessed across several major domains of life activities (i.e. home, work, social and education) over the past six months and during childhood. Participants rated items (8 items for childhood; 10 items for adulthood) according to the frequency with which they experienced problems on the 4-point Likert scale (0 = never or rarely, 1 = sometimes, 2 = often, and 3 = very often). The impairment items were summed to produce a total impairment score between 0 and 24 for childhood, and adulthood between 0 and 30.

#### *Statistical analysis*

Descriptive statistics (e.g. frequency) were scrutinised to assess the prevalence rate of positive screening for ADHD subtypes in the female prisoner sample. Further analyses assessed prevalence rates and impairment by age. Assumptions of normality were violated in the age-related data, therefore, non-parametric tests were utilised to assess age data. Spearman's Rho correlation coefficient was calculated to assess the relationship between ADHD symptom frequency and age.



The data were split into two age categories, representing young adults (18-25years) and adults (26-45years). Recent reports and research on offending in the UK and USA highlight young adults as a unique subsample of offenders due to their over-representations in the justice system (e.g. Britton, 2012; Farrington, Loeber, & Howell, 2012). Within the offending literature, young adults are commonly categorised as aged 18-25years, which is in line with Arnett's (2000) 'emerging adulthood' and international recommendations that, in the context of law, adolescence should be prolonged to the age of 25 years (Farrington, Loeber, & Howell, 2012). More specifically, these age categories are consistent with previous research on ADHD in female prison populations (Rösler et al., 2009). The prevalence rates of ADHD symptoms by age were compared using Chi-square. Cramer's  $V$  was selected as an appropriate effect size statistic, due to the 2x3 contingency table, which is consistent with current statistical recommendations (McHugh, 2013; Stamatis, 2002). Recommended descriptors were used to interpret Cramer's  $V$  (Rea & Parker, 1992).

Functional impairment data were assessed using parametric statistics. Pearson's correlation coefficient ( $r$ ) assessed the relationship between symptom frequency and impairment. Three participant data groups were created: those who did not screen positive for ADHD on either the childhood or adult scales (non-ADHD group); those who screened positively for childhood plus adult ADHD (childhood+adult ADHD) and those who reported only adult ADHD symptoms (adult-only ADHD). The functional impairment scores of the groups were compared using a one-way ANOVA; where significant, planned comparisons were utilised to confirm differences between pairs of groups. Cohen's  $d$  was calculated to assess the effect size, and interpreted within current published descriptors (Cohen, 1988).

## Results

*Screening rates of ADHD*

All 69 participants completed both childhood and adult symptom scales. Of this group, 28 (41%) reported childhood symptoms that fulfilled the criteria for ADHD, of whom 5 (18%) were of the predominantly inattentive type, 3 (11%) were of the predominantly hyperactive/impulsive type and 20 (71%) were of the combined type.

All 28 (41%) prisoners who screened positive for childhood ADHD also reported symptoms that met criteria for ADHD in adulthood. In addition, a further 13 (19%) participants reported symptoms that met criteria for adult ADHD, but had not screened positive for ADHD on the childhood scale. Of these participants, 7 (54%) were of the predominantly inattentive type, 2 (15%) were of the predominantly hyperactive/impulsive type and 4 (31%) were of the combined type

*Table 1. Screening rates of ADHD in childhood and adulthood*

	<b>Childhood n (%)</b> <b>(N = 69)</b>	<b>Adulthood</b> <b>(+childhood) n (%)</b> <b>(N = 69)</b>	<b>Adulthood</b> <b>only n (%)</b> <b>(N = 69)</b>
ADHD	28 (41%)	28 (41%)	13 (19%)
Combined	20 (71%)	19 (68%)	7 (54%)
Hyperactive/impulsive	3 (11%)	6 (21%)	2 (15%)
Inattentive	5 (18%)	3 (11%)	4 (31%)

*ADHD rates by age*

A Spearman's Rho correlation confirmed that age was inversely related to ADHD symptom frequency in childhood ( $r_s = -.47, p < .001$ ) and to adult ADHD symptoms ( $r_s = -.55, p < .001$ ), indicating that younger participants reported more frequent symptoms.

Prevalence rates (screened positive or not) for young adults (18-25years) were compared to adults (26-45years). Chi-Squared tests confirmed that a greater proportion of participants in the young adult category were likely to screen positive for childhood and adult ADHD (both  $\chi^2 = 8.69$ ,  $p = .004$ ) with a moderate effect sizes ( $V = .36$ ). A Fisher's Exact Test confirmed no significant difference in the proportion of young adult and adults who reported adult-only symptoms of ADHD ( $p > .05$ ,  $V = .11$ ). Positive screening rates by age category are shown in Table 2.

*Table 2. Screening rates by age*

	25 years and under n (%)	26 - 45 years n (%)
Childhood ADHD	15 (65.2%)	13 (28.3%)
Child+adult ADHD	15 (65.2%)	13 (28.3%)
Adult-only ADHD	3 (13%)	10 (21.7%)

#### *Functional impairment*

The childhood impairment scale was completed by 52 participants; the current impairment scale was completed by 56 participants. Functional impairment attributed to ADHD symptoms was positively associated with frequency of symptoms in childhood ( $r_s = .83$ ,  $p < .001$ ) and adulthood ( $r_s = .78$ ,  $p < .001$ ), such that those with more frequent symptoms experienced greater associated functional impairment.

The functional impairment scores for three screening groups (non-ADHD; child+adult ADHD; adult-only ADHD) were compared. A one-way ANOVA confirmed that there was a significant difference in adult ( $F(2,66) = 31.92$ ,  $p < .001$ ,  $\eta_p^2 = .49$ ) and childhood ( $F(2,66) = 28.98$ ,  $p < .001$ ,  $\eta_p^2 = .47$ ) impairment scores across groups. The child+adult ADHD group reported significantly higher childhood impairment ( $t(54) = -6.55$ ,  $p < .001$ ,  $d = -1.75$ ) and current impairment ( $t(54) = -7.82$ ,

$p < .001$ ,  $d = 2.09$ ) than the non-ADHD group. The adult-only ADHD group reported significantly higher current impairment scores than the non-ADHD non-ADHD group ( $t(39) = -4.1$ ,  $p < .001$ ,  $d = -1.39$ ); however, the groups did not differ on childhood impairment scores ( $p > .05$ ,  $d = .002$ ). Furthermore, the child+adult ADHD group reported significantly higher childhood impairment ( $t(39) = 5.96$ ,  $p < .001$ ,  $d = 2.16$ ) and current impairment ( $t(39) = 2.37$ ,  $p = .02$ ,  $d = .81$ ) than the adult-only ADHD group.

*Table 3. Mean impairment scores comparing those who screened positive or negative for childhood and adulthood ADHD*

	No ADHD ( $n = 28$ ) $M(SD)$	Childhood+adult ADHD ( $n = 28$ ) $M(SD)$	Adult only ADHD ( $n = 13$ ) $M(SD)$
Childhood impairment	3.75 (5.85)	13.82 (5.66)	3.62 (3.55)
Current impairment	5.07 (6.64)	19.64 (7.29)	14.08 (6.32)

## Discussion

This paper reports the first study of the prevalence of ADHD amongst a UK female prison sample. As predicted, the prevalence rate of ADHD in the all female prison sample was greater than reported the estimated 2.5% in the general population (Simon et al. 2009). In line with previous estimates of ADHD in female prisoners in the USA and Europe (Hennessey et al. 2010; Edvinsson et al. 2010), 41% of the participants in the current study screened positive for ADHD in adulthood, all of who had also screened positive for ADHD in childhood. Furthermore, previously reported age

differences (Rösler et al. 2009) were replicated in the current study, with a higher prevalence rate of adulthood ADHD amongst younger prisoners (25 years and under). Again, prevalence rates were much greater for both age groups compared to previous reports (Rösler et al. 2009).

Consistent with previous research (Edvinsson et al. 2010), a proportion of the current sample screened positive for ADHD in adulthood only. This finding raises an interesting question regarding the experience of ADHD throughout the lifespan, and the accurate diagnosis of ADHD in adulthood. Diagnostic assessments in adulthood rely on the accurate retrospective self-reporting of symptoms and impairment during childhood. It is likely that individuals who experienced severe symptoms during childhood will remember these in adulthood; however, there may be some adults who do not have an accurate or reliable memory of specific symptoms and impairment, or may under-report these experiences from childhood. Alternatively, it may be that the group who screened positively for ADHD in adulthood only represent a group of individuals who experience other mental health problems that might mimic symptoms of ADHD (e.g. borderline personality disorder) and thus skew their self-report. Future research should consider these issues.

Functional impairment attributed to symptoms of ADHD during childhood and adulthood was also assessed in the current study, with more frequent symptoms associated with greater impairment. Group comparisons confirmed our hypothesis; participants who screened positive for ADHD (childhood+adulthood) reporting greater functional impairment during childhood and adulthood than those without ADHD. Participants who screened positive for ADHD in adulthood only reported greater functional impairment in adulthood compared to those without ADHD, with similar low levels of impairment reported during childhood for the two groups.

However, levels of impairment for adulthood only were less than those for childhood+adulthood ADHD across the lifespan, demonstrating that those individuals with the longest history of symptoms experienced the greatest impairment. There is a dearth of literature reporting impairment associated with ADHD symptoms in adult female offenders; however, the findings of the current study are comparable to previous research with adults in the community that have shown high levels of impairment across life domains compared to controls (Biederman et al. 2006). In addition, the reported impairment is consistent with the serious social and health behaviour consequences reported in previous research with similar samples (Hennessey et al. 2010).

The high prevalence rate of ADHD in the current sample of female prisoners contributes to the variability in prevalence rates reported in previous research, being consistent with those reporting high levels (Hennessey et al. 2010). This variability could be due to differences in measurement; some studies have employed a self-report screening tool as in the current study (e.g. Edvinsson et al. 2010; Hennessey et al. 2010; Cahill et al. 2012), with variation in the tools used, whilst others have utilised diagnostic interview schedules (e.g. Gunter et al. 2008). The lack of consistent methods of assessment is a limitation of the body of literature more generally. The common use of self-report rating scales provides an overview and estimate of possible prevalence of ADHD and highlights where further assessment may be warranted; however, the retrospective recall of symptoms from childhood may be inaccurate (Mannuzza et al. 2002). As such, those studies that have employed clinical interviews may provide a more accurate representation of prevalence. Future research should determine whether this might be a reason for differences in estimated prevalence, or

whether other factors such as culture and differences in the judicial system may play a part.

#### *Limitations and future directions*

The current study is limited by the reliance on self-report data. The aim of the study was to establish an estimation of the rate of ADHD in female prisoners in the UK, in order to provide a comparison with data from other countries. Previous research in the USA and Europe (e.g. Edvinsson et al 2010; Cahill et al 2012; Rösler et al 2009) have similarly utilised a self-report screening method, which makes our study directly comparable. However, self-report measures introduce issues relating to subjectivity and accuracy. It is important that future research confirms the rate of ADHD in female prison populations across the world by conducting recognised clinical interviews. Indeed, a similar rate of ADHD in female prisoners was reported when clinical interviews were employed (Gunter et al 2008).

A further related limitation to the current study is the lack of information regarding other related or co-occurring disorders. Although participants denied having a learning disability, clinical assessment would confirm whether the presence of a learning disability could have provided a better explanation of ADHD symptoms. The symptoms of ADHD reported by participants could potentially be better explained by another mental health disorder, for example borderline personality disorder or antisocial personality disorder, or a behavioral disorder, such as conduct disorder and oppositional defiant disorder. Previous studies have reported high rates of mood disorders (60.7%) and anti-social personality disorder (26.8%) in female prisoners (Gunter et al 2008); therefore, it is likely that the current sample also experience similar mental health problems. In addition, the relationship between conduct disorder, ADHD and criminality has been studied in males with some mixed findings

(Mannuzza et al. 2008; Satterfield and Schell 1997) and requires consideration for females. Future research can address these limitations by assessing the presence of ADHD and other related disorders in female prisoners through full diagnostic interviews.

Data regarding the participants' type of offence or medication use were not collected in the current study. The reported symptoms of ADHD could have been affected by any medication that participants were taking, either in terms of masking such symptoms and thereby reducing the report of them, or by causing similar symptoms as a side-effect. Future research should consider the relationship between experience of ADHD symptoms throughout the lifespan and forensic factors, such as type of offence, sentence, behaviour record within prison, engagement with rehabilitative programmes, etc. In particular, it is important to build an accurate understanding of how ADHD symptomology is related to the occurrence of serious incidents in female prisons, especially since incidents of self harm and suicide are a major concern in female prisons (HMP 2006). ADHD increases the likelihood of psychiatric morbidity and in this case self-harm and suicide may be a serious risk factor for female prisoners with ADHD. Symptom severity in adult ADHD has been linked to the incidence of self-harm behaviour and suicidal ideation and attempts (Taylor et al. 2014), and a diagnosis of ADHD more than doubles the risk of suicide in inmates (London 2009). Thus, future research should consider the links between ADHD and incidence of self-harm and suicide attempts reported within UK prisons. An understanding of how these factors interact, will inform supportive and therapeutic environments as recommended in the HM Chief Inspector of Prisons report (HMP 2006) as a means to reduce serious incidents. In future it would also be useful to assess how co-morbid disorders such as conduct disorders, substance misuse



and depression mediate the relationship between ADHD and serious incidents in a female prison setting.

### *Conclusion*

The present study indicated higher rates of ADHD amongst a UK female prison population compared to the general population, alongside greater levels of functional impairment compared to those without ADHD symptoms. These findings indicate the importance of routine screening for ADHD within the prison system to identify those offenders who may require further specialist assessment. The estimated prevalence rate suggests that there may be an unmet need within the female prison population, and additional support in the form of psychopharmacological or psychological input may be warranted for some offenders. Such support has the potential to reduce the burden on prisons in terms of cost and management needs, as well as possibly decrease the number of serious incidents. Ultimately, understanding the needs of the prison population will serve to inform the best form of rehabilitation to society.

### *Statement of ethical standards*

The screening data was collected as part of routine clinical practice. Ethical standards (1964 Declaration of Helsinki and later amendments) were adhered to with regards to informed participant consent and right to withdraw. Thus all participants provided informed consent prior to participation. Data collected were anonymized and stored confidentially.

### *Conflict of interest*

The authors declare that they have no conflict of interest.

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