**PRISONERS WITH NEURODEVELOPMENTAL DIFFICULTIES: VULNERABILITIES FOR MENTAL ILLNESS & SELF-HARM**

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**Abstract**

**Background:** Research into neurodevelopmental disorders in adult offenders has tended to be disorder specific, so hindering service planning for a group of offenders with similar vulnerabilities.

**Aims:** To examine vulnerabilities for mental illness and self-harming behaviours among male prisoners screening positive for a range of neurodevelopmental difficulties – including but not confined to disorders of intellectual ability, attention deficit hyperactivity and in the autistic spectrum.

**Method:** In a cross-sectional study, prisoners who screened positive for neurodevelopmental difficulties were compared to prisoners who screened negative for them on indicators of suicide related and self-harm behaviours, mental illness and substance misuse using the Mini International Neuropsychiatric Interview (MINI).

**Results:** Of 87 prisoners who screened positive for neurodevelopmental difficulties, 69 had full MINI mental health data. In comparison with 69 neurotypical men in the same prison, the neurodevelopmental difficulties group were significantly more likely to have thought about self-harm and suicide in the last month and to have significantly higher rates of concurrent mental disorders including psychosis, anxiety, depression, personality disorder and substance dependency disorders.

**Conclusions:** This is one of the first studies to examine the mental health of adults with neurodevelopmental difficulties in a prison setting. This group, unlike those who meet diagnostic threshold are not routinely considered by mental health or correctional services. The study found prisoners with neurodevelopmental difficulties showed greater vulnerability to mental disorder and thoughts of suicide and suicide related behaviours, than other prisoners;. Accordingly, we recommend routine early screening across the criminal justice system for any neurodevelopmental difficulties in order to inform decision making on the most appropriate disposal and support..

**Keywords**

Mental illness, MINI, Neurodevelopmental disorders, Neurodevelopmental difficulties, Prisoners, Screening.

**Introduction**

Neurodevelopmental disorders are conditions with onset in early infancy and often co-occur (DSM-5 American Psychiatric Association, 2013). According to DSM-5, neurodevelopmental disorders include intellectual disability, communication disorders, autism spectrum disorder, attention-deficit/hyperactivity disorder (ADHD), specific learning disorders and motor disorders such as tic disorder. These disorders are lifelong and impact on cognitive, social, language, motor and behavioural development.

In spite of evidence of significant comorbidity between neurodevelopmental disorders and of higher rates of offending in children with them (Hughes, 2012; Hughes, 2015), there is only a small number of relevant studies relating to adults (Underwood et al., 2013; McCarthy et al, 2016). Further, studies with adult prisoners have tended to be disorder specific, relating only to ADHD, (Gudjonsson, et al, 2014) or autism spectrum disorder (King and Murphy, 2014) or intellectual disability (Chaplin et al, 2017). In detention settings, it has been estimated that about 25% of residents have ADHD (Young et al., 2011). In the UK, it is estimated that 7% of prisoners with intellectual disability have a tested IQ below 70 and a further 23% have an IQ below 80 (Mottram, 2007). About 1-4% of prisoners are estimated to have autism spectrum disorder (Robinson et al, 2010; Fazio et al, 2012). Variations in prevalence estimates are due partly to the criteria adopted for such classification, but, in addition, there are many people with neurodevelopmental problems which may fall just short of the classification standard. This is most apparent in prisoners with borderline intellectual functioning but can also be seen in those with ADHD and autism spectrum disorder when age related changes to symptoms are considered (Kooij et al, 2010).

*Mental illness, suicidality & neurodevelopmental disorders*

There is a high rate of comorbid mental illness across most, if not all neurodevelopmental disorders (Cooper et al. 2007, McCarthy et al, 2016, Spain et al, 2015). Prisoners with intellectual disability are more likely to have co-morbid mental disorder such as psychosis and substance misuse (Chaplin et al, 2017 & Hassiotis et al, 2011) and also to self-harm or be suicidal (Chaplin et al, 2017).

In addition to high rates of comorbid mental illness, there is also evidence that adults with ADHD, intellectual disability and autistic spectrum disorders suffer higher rates of suicide related behaviours and self-harm (Impey and Heun, 2012; Lunksy et al., 2012; Mollinson and Chaplin, 2014; Segers and Rawana, 2014). In the general population of developed countries fewer than 2% of people reported suicidal ideation in the past year (Borges et al., 2010) ), consistent with UK figures of 2.3% (Garlow, 2005), whereas as many as 16.2% are reported as presenting with suicide ideation in the UK criminal justice system (Forrester et al, 2016).

To date there is little evidence on the mental health or self-harm or suicide related behaviours among prisoners with neurodevelopmental disorders or difficulties. This is in spite of its being widely accepted that prisoners have higher rates of mental disorder and are at increased risk of suicide when compared to the general population, recognised as global issues for incarcerated people (Jack et al., 2018). Our aim was to compare the mental health and suicide related behaviours of prisoners who had screened positive for either ADHD, intellectual disability or autistic spectrum disorder with prisoners who have screened negative for these three conditions in one UK prison. Our hypotheses were:

1. Men with neurodevelopmental difficulties have a higher rate of mental disorders compared to those without neurodevelopmental difficulties
2. Men with neurodevelopmental difficulties have a higher rate of self-harm and suicide related behaviours than those without neurodevelopmental difficulties

**Method**

The study was granted ethical approval by the National Research Ethics Service (NRES) Committee North East – Northern & Yorkshire (ref: 12/NE/0040) and National Offender Management Service (NOMS) approval by the prison governor.

*Setting*

This was a cross-sectional study set in a male prison in London (see McCarthy et al., 2015; McCarthy et al., 2016 for more details) run by the National Offenders Management Service (NOMS), part of the UK’s Ministry of Justice.

*Participants*

Eligibility criteria for inclusion in the study were that participants demonstrated capacity to give informed consent and had sufficient use and understanding of English to take part. A clinical capacity assessment was conducted by researchers trained in the technique. The capacity assessment followed the principles of the Mental Capacity Act 2005 with a functional assessment of capacity using easy read information and consent forms. This assessment was undertaken at the time of the initial meeting with the participant but prior to the screening for neurodevelopmental difficulties.

Participants were recruited between May 2012 and June 2013 (full details of the recruitment process are described in McCarthy et al., 2015 & 2016). The study prison held 798 prisoners at the time. 378 were approached to take part in the study, including all new arrivals and men referred to the study by prison staff; 240 consented to the screening interview as described below.

*Procedure*

The sample was recruited in three mains ways - by directly approaching prisoners, referral from healthcare staff, and following self-referral. The direct approach to prisoners was by giving each new arrival information on the study. Healthcare staff all received information on the study so could make direct referrals and other prisoners heard about the study and then self-referred.

Study information giving and consent usually occurred in private; occasionally it was in the presence of staff or other prisoners if the potential participant wanted that kind of support. Potential participants were given time to consider their participation and encouraged to discuss it with others (e.g. health care staff, peer support workers, friends) before making a decision.

*Measures*

*The self-report 20-item Autism Quotient (AQ-20)* was used to measure autistic spectrum traits (Brugha et al., 2011). A score greater than or equal to 10 indicates the presence of clinically important autistic traits requiring further assessment (NICE, 2014). The AQ-20 was chosen for its brevity and availability. Unlike the original studies for the AQ-20 face-to-face interviews with participants were conducted and the items rated by a researcher.

*The seven-item Learning Disability Screening Questionnaire (LDSQ)* (McKenzie & Paxton, 2006) was used to screen for intellectual disability. This has a reported sensitivity of 82.3% and specificity of 87.5% within forensic settings (McKenzie et al., 2012). Results are expressed as a percentage; 100% indicates a perfect score and <46% indicates the presence of Intellectual disability.

*The Adult Self-Report Screen for ADHD* (ASRS; Adler, et al., 2003) was chosen to measure symptoms and signs of ADHD as it has been used in other prison studies. It has a sensitivity of 91.4% and a specificity of 96.0% (Ustun et al., 2017).

*The Mini International Neuropsychiatric Interview (MINI) v.6.0.0* was then used to assess participants for suicide related behaviours, self-harm, mental health problems and substance misuse using. This is a brief structured diagnostic interview for DSM-IV and ICD-10 psychiatric disorders with a reported minimum 0.70 specificity and 0.85 sensitivity across disorders (Lecrubier et al, 1997) The MINI is well accepted in a number of settings including primary care (Van Viet& De Beurs, 2007; Pettersson et al., 2018). The MINI Suicidal Scale is a subscale on which participants are scored according to risk - high, moderate or low and reported to have a good sensitivity (0.61-0.75) and specificity (0.61-0.75) for patients with a history of self-harm acts (Roaldset, Linaker & Bjørkly, 2012; Roos, Sareen & Bolton, 2013). Given the transient nature of the prison population, of the prisoners who screened positive for neurodevelopmental difficulties, only 69 completed the MINI. These men were compared with a same size sample from the same prison with no neurodevelopmental difficulties evident on screening. The compassion group was not matched on other criteria other than being in the same prison at a similar time.

To provide further context, demographic and offence data were also collected from both self-report and case note review.

***Analysis***

Chi-square likelihood ratios were used to analyse categorical and continuous data, respectively, using SPSS v 22. This method is recommended for small samples and where any of the cell counts may be under five (Özdemir & Eyduran, 2005).

**Results**

*Demographics & offending behaviour*

In total, 87 participants screened positive for neurodevelopmental difficulties, 65 for ADHD, 46 for ASD and 33 for intellectual disability, but only 69 of them stayed in prison long enough to complete the MINI. Table 1 shows a trend towards difference between men with neurodevelopmental difficulties and those without according to age band, mainly accounted for by more of the neurodevelopmental difficulty group being in the youngest (20-29) age band; this difference was statistically significant when tested with all 240 screened men (X23 =8.60, p<0.035). There were also significant differences in ethnicity, with over three-quarters of the men in the neurodevelopmental difficulties group being white compared with just under half of the neurotypical group.

Table 1 about here

*Comorbidity of Neurodevelopmental Disorders*

Figure 1 shows the rates of co-existing neurodevelopmental disorders among the 69 men for whom mental health data were also available. Just over half (36, 52.2%) had at least two such disorders highlighting the considerable overlap of these difficulties.

Figure 1 about here

*Offence category*

In total there was offence data for 65 from the comparison group and 64 from the neurodevelopmental difficulties group. Table 2 shows the association between the index offence (type of offence resulting in this imprisonment) and neurodevelopmental difficulties. There was no difference between groups for acquisitive offences, motoring offences or violence. Prisoners in the group with neurodevelopmental difficulties were significantly less likely to have committed drug offences, but significantly more likely to have been convicted of a sex offence than the neurotypical group

Table 2 about here

*Risk for self-harm and/or suicide behaviours*

Men with neurodevelopmental difficulties were significantly more likely than those without to have thought about self-harm or suicide in the month prior to the research assessment. They were also more likely to report an attempted suicide in that period as well as more likely to report attempted suicide over the whole life to date (see table 3).

Table 3 about here

*Mental illness and personality disorder comorbidities*

Table 4 shows that men with neurodevelopmental difficulties were significantly more likely than the neurotypical men to have a history of any mental illnesses or presentation at the time of assessment, specifically including psychosis, depression, mania or hypomania, generalised anxiety disorder, social phobia, obsessive compulsive disorder and anti-social personality disorder. The risk of mental illness and anti-social personality disorder was further increased for prisoners with more than one neurodevelopmental difficulty. There was a trend towards PTSD also being more likely among the men with any neurodevelopmental problem, and the relationship was significantly more likely to be diagnosed among the men who screened positively for more than one type of neurodevelopmental difficulty.

Table 4 about here

*Risk for History of Alcohol and Drug Use*

Prisoners with neurodevelopmental difficulties were significantly more likely to have been dependent on alcohol or drugs, but within substance misuse subgroups, the comparison and neurodevelopmental difficulty groups were about equally likely to have abused drugs, alcohol or both (see table 5).

**Discussion**

This is one of the first studies to go beyond diagnoses and examine neurodevelopmental symptoms and signs in adult offender populations and their mental health need correlates. The combinations are not routinely considered by mental health services. Our findings do, however, concur with those in a previous study of prisoners with neurodevelopmental disorders (Young et al.,2017) in that either having one neurodevelopmental disorder or several increases the risk for psychiatric symptoms, self-harm and suicide related behaviours and alcohol and drug dependency.

Clinical Implications

*Screening*

Our study has demonstrated the potential value of screening for neurodevelopmental disorders in prisoners. It is not only meeting diagnostic threshold that is associated with increased risk of mental illness and behavioural problems such as self-harm and suicide. Greater emphasis on taking a wider perspective on what is clinically important is indicated. The approach to identifying offenders within a spectrum of neurodevelopmental difficulties should be routine and at the earliest stage possible in the criminal justice to inform decision making on the most appropriate criminal justice and rehabilitative pathway.

*Mental Health*

Those identified with neurodevelopmental difficulties in prison were more likely than neurotypical men to suffer from a range of mental disorders, including personality disorder. Our study has reported on a wider range of mental health needs that previous studies including substance use, self-harm behaviour, suicidal behaviour and specific diagnostic categories of psychiatric disorder and confirmed the considerable vulnerability of this group of prisoners to a wide range of mental disorders. Our findings add to the debate on whether we should be taking a different approach to identifying and supporting a particular group of at risk of offenders in a custodial setting. We found that having at least one type of neurodevelopmental difficulty appeared to increase the risk of mental illness and anti-social personality disorder over that in neurotypical controls. Prisoners with ADHD have previously been found to have higher rates of antisocial and borderline personality disorders (Westmoreland et al., 2010), and this is consistent with the apparently high rates of personality disorder in our neurodevelopmental difficulty group as over 70% of those with a diagnosed personality disorder screened positive for ADHD. This also raises the question as to whether particular combinations of neurodevelopmental disorders may make certain behavioural characteristics more likely.

The group pf prisoners most at risk to be to be diagnosed with PTSD were those with a complex presentation of more than one type of neurodevelopmental difficulty. This may be in part be due to one disorder increasing the risk of another, but it could also be that PTSD is less likely to be diagnosed among people with neurodevelopmental difficulties in the community as they do not volunteer such problems, but more likely to be observed when people are subject to routine screening, as in prison (Devaney et al., 2019). While absolutely not advocating imprisonment, this does suggest that it could and should provide an opportunity for improved problem recognition and solving for this vulnerable group. The rate of psychosis was also apparently higher in the group with neurodevelopmental difficulties, although the number in the comparison group was only one. This finding is however in keeping with research in other settings of adults with intellectual disability or autistic spectrum disorders showing a higher risk for psychosis in those with neurodevelopmental disorders (Morgan et al, 2008; Larson et al; 2017).

*Self-harm and suicide related behaviours*

In examining, self-harm and suicide related behaviours, our study highlights still more vulnerabilities among men with neurodevelopmental difficulties in prison. to suicide related behaviours. Prison suicide and self-harm rates in England and Wales in 2019 are higher than they have ever been since the start of systematic recording in 1978. Although evidence for a link between neurodevelopmental difficulties and suicide related behaviours is not entirely new - suicide has been identified as the leading cause of premature death in adults with autism spectrum disorder in community settings (Hirvikoski et al, 2016) – our findings support the principle of greater vigilance with respect to suicide risk in the face of any neurodevelopmental problem in a prison setting.

*Alcohol or drug use or dependency,*

Previous studies of substance misuse by people with ADHD have shown an increased risk of contact with the criminal justice system (CJS) (Young et al, 2011), as have several studies of adults with intellectual disability if they use substances (Taggart and Chaplin, 2014; Chaplin et al, 2015, McGilvray et al, 2016). We found higher reported rates of substance *dependency* in the neurodevelopmental difficulties group, although they were less likely to be convicted for drug related offences compared to the neurotypical group. This finding too fits with existing evidence, as above, that the combination of neurodevelopmental disorder and substance dependency leaves the sufferers at particular risk of being in detention settings or prisons. A factor in this may be that such people find it disproportionately difficult to access to drug and alcohol services which may be even more so in a prison setting as they require suitable adaptations to such treatment programme which is less likely to happen in prison (Taggart and Chaplin, 2014).

*Limitations*

The study took place in one site, a category C male prison, which may limit the generalisability of the findings. It was not possible to randomise the sample and by including only those referred to the study by prison staff or by self-referral we will have introduced some recruitment bias. Given the nature of prison settings, the research team was unable to complete evaluations with all suitable participants. Although our aim was to include prisoners with any evidence of neurodevelopmental problems rather than clear diagnoses, our findings may be limited by the screening tools, the reliability and validity of which has been tested with general samples, but not prisoners who are recognised as likely to have lower levels of literacy.

*Implications*

There are major gaps in current healthcare provision locally and internationally both in prison and mental health services for people with neurodevelopmental difficulties, and yet, as highlighted in this study, they would be likely to reduce key risks. Failure to provide services has a significant human cost, although the financial burden on local health and social services in attempting to address this gap is also evident (Chaplin et al, 2017). People with neurodevelopmental difficulties are subject to the same sentencing options as those without. All too often, however, use of community options is not considered during sentencing for this group (Her Majesty’s Inspectorate of Probation, 2014). More urgency is therefore required in developing court diversion and liaison services to inform community sentencing options where appropriate. Probation services and youth offending teams could screen using the tools adopted in this study and highlight offender needs more effectively. In line with the Bradley Report (Ministry of Justice, 2009) and a more recent report by HM Inspectorate of Probation (2014), initiatives are needed to improve the recognition of those with neurodevelopmental needs early on in their path through the criminal justice system.

**Conclusion**

Our findings confirm the likelihood of finding a substantial group of adult men in prison who have neurodevelopmental difficulties. We found further that they are likely to form a disproportionately vulnerable group in terms of risk of other disorders including substance use disorders, mental illness, personality disorders and suicide related behaviours, so it is important that prisons have systems for identifying them and responding. Better still, screening for neurodevelopmental difficulties should become more routine early on in an offender’s pathway at the Police Station or Court and those who could be safely managed in the community diverted or sentenced to appropriate facilities there.

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**References**

Adler, L., Kessler, R. C,. & Spencer T. (2003). *Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist.* World Health Organisation: Geneva.

Brugha, T.S., McManus, S., Bankart, J., Scott, F., Purdon, S., Smith, J., Bebbington, P., Jenkins, R,. & Meltzer, H. (2011.) Epidemiology of autism spectrum disorders in adults in the community in England. *Archives of General Psychiatry,* 68(5), pp.459-465.

Borges, G., Nock, M.K., Abad, J.M.H., Hwang, I., Sampson, N.A., Alonso, J., Andrade, L.H., Angermeyer, M.C., Beautrais, A., Bromet, E. and Bruffaerts, R., (2010). Twelve month prevalence of and risk factors for suicide attempts in the WHO World Mental Health Surveys. *The Journal of Clinical Psychiatry,*71(12), p.1617.

Chaplin, E., McCarthy, J., Underwood, L., Forrester, A., Hayward, H., Sabet, J., Mills, R., Young, S., Asherson, P,. and Murphy, D. (2017). Characteristics of prisoners with intellectual disabilities*. Journal of Intellectual Disability Research,* 61(12), pp.1185-1195.

Chaplin, E., Partsenidis, I., Samuriwo, B., Underwood, L., & McCarthy, J. (2015). Does substance use predict contact with the criminal justice system for people with intellectual disabilities?. *Journal of Intellectual Disabilities and Offending Behaviour,* 5(3), 147-153.

Cooper, S.A., Smiley, E., Morrison, J., Williamson, A., & Allan, L. (2007). Mental ill-health in adults with intellectual disabilities: prevalence and associated factors. *The British Journal of Psychiatry,* 190, 27-35.

Devaney, J., Hassiotis, A., Katona, C., Matcham ,F. & Sen, P. (2019). Ascertainment and Prevalence of Post-Traumatic Stress Disorder (PTSD) in People with Intellectual Disabilities. Journal of Mental Health Research in Intellectual Disabilities. DOI:10.1080/19315864.2019.1637979

DSM-5 American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders.* Arlington: American Psychiatric Publishing.

Fazio, RL., Pietz, C.A,. & Denney, RL. (2012). An estimate of the prevalence of autism-spectrum disorders in an incarcerated population. *Journal of Forensic Psychology*, 4, 69-80.

Forrester, A., Samele, C., Slade, K., Craig, T., & Valmaggia, L. (2016). Suicide ideation amongst people referred for mental health assessment in police custody. *Journal of Criminal Psychology*,6(4), 146-156.

Garlow, S. J. (2005). Study estimates incidence of suicidal ideation and suggests factors that put people at risk. Evidence-based mental health, 8(2), 53.

Gudjonsson, G. H., Sigurdsson, J. F., Sigfusdottir, I. D., & Young, S. (2014). A national epidemiological study of offending and its relationship with ADHD symptoms and associated risk factors*. Journal of Attention Disorders,* 18(1), 3-13.

Hassiotis, A., Gazizova, D., Akinlonu, L., Bebbington, P., Meltzer, H., & Strydom, A. (2011). Psychiatric morbidity in prisoners with intellectual disabilities: analysis of prison survey data for England and Wales. *The British Journal of Psychiatry,* 199, 156-157.

Her Majesty’s Inspectorate of Probation. (2014). *A joint inspection of the treatment of offenders with learning disabilities within the criminal justice system – phase 1 from arrest to sentence*. Her Majesty’s Inspectorate Probation, Manchester.

Hirvikoski, T,. Mittendorfer-Rutz, E,. Boman, M,. Larsson, H,. Lichtenstein, P,. & Bölte, S. (2016). Premature mortality in autism spectrum disorder. *The British Journal of Psychiatry*, 208, 232-238.

Hughes, N. (2012). Nobody made the connection: The prevalence of neurodisability in young people who offend.

Hughes, N. (2015). Understanding the influence of neurodevelopmental disorders on offending: utilizing developmental psychopathology in biosocial criminology. *Criminal Justice Studies*, 28(1), 39-60.

Impey, M., & Heun, R. (2012). Completed suicide, ideation and attempt in attention deficit hyperactivity disorder. *Acta Psychiatrica Scandinavica,* 125(2), 93-102.

Jack., H.E., Fricchione, G., Chibanda, D., Thornicroft,G., Machando,D. & Kidia, K. (2018). Mental health of incarcerated people: a global call to action. The Lancet Psychiatry, 5(5), 391-392.

King, C., & Murphy, G. H. (2014). A systematic review of people with autism spectrum disorder and the criminal justice system. *Journal of Autism and Developmental Disorders,* 44(11), 2717-2733.

Kooij, S.J., Bejerot, S., Blackwell, A., Caci, H., Casas-Brugué, M., Carpentier, P.J., Edvinsson, D., Fayyad, J., Foeken, K., Fitzgerald, M,. and Gaillac, V., (2010). European consensus statement on diagnosis and treatment of adult ADHD: The European Network Adult ADHD. *BMC Psychiatry,* 10(1), p.67.

Larson, F. V., Wagner, A. P., Jones, P. B., Tantam, D., Lai, M.-C., Baron-Cohen, S.,& Holland, A. J. (2017). Psychosis in autism: comparison of the features of both conditions in a dually affected cohort. *The British Journal of Psychiatry,* 210(4), 269–275. http://doi.org/10.1192/bjp.bp.116.187682

Lecrubier, Y., Sheehan, D.V., Weiller, E., Amorim, P., Bonora, I., Sheehan, K.H., Janavs, J,. and Dunbar. G.C. (1997). The Mini International Neuropsychiatric Interview (MINI). A short diagnostic structured interview: reliability and validity according to the CIDI. *European Psychiatry,* 12(5), pp.224-231.

Lunsky, Y., Raina, P,. & Burge, P. (2012). Suicidality among adults with intellectual disability. *Journal of Affective Disorders,* 140, 292-295.

McCarthy, J., Chaplin, E., Underwood, L., Forrester, A., Hayward, H., Sabet, J. Young, S., Asherson, P., Mills, R& Murphy, D. (2016). Characteristics of prisoners with neurodevelopmental disorders and difficulties. *Journal of Intellectual Disability Research,* 60(3), 201-206.

McCarthy, J., Chaplin, E., Underwood, L., Forrester, A., Hayward, H., Sabet, J., Young, S., Asherson, P., Mills, R. & Murphy, D. (2015). Screening and diagnostic assessment of neurodevelopmental disorders in a male prison. *Journal of Intellectual Disabilities and Offending Behaviour,* 6(2), null.

McGillivray, J. A., Gaskin, C. J., Newton, D. C., & Richardson, B. A. (2016). Substance use, offending, and participation in alcohol and drug treatment programmes: a comparison of prisoners with and without intellectual disabilities*. Journal of Applied Research in Intellectual Disabilities*, 29(3), 289-294.

McKenzie, K., Michie, A., Murray, A., & Hales, C. (2012). Screening for offenders with an intellectual disability: the validity of the Learning Disability Screening Questionnaire. *Research in Developmental Disabilities,* 33(3), 791-795.

McKenzie, K., & Paxton, D. (2006). *LDSQ/Learning Disability Screening Questionnaire: Manual.* GCM Records, Edinburgh.

Ministry of Justice. (2009). *Lord Bradley’s report on people with mental health problems or learning disabilities in the criminal justice system: the government’s response.* Ministry of Justice, London.

Mollinson, E,. and Chaplin, E. (2014). A review of risk factors associated with suicide in adults with intellectual disability. *Advances in Mental Health and Intellectual Disabilities,*8(5), pp.302-308.

Morgan, V., Leonard, H., Bourke, J., & Jablensky, A. (2008). Intellectual disability co-occurring with schizophrenia and other psychiatric illness: Population-based study. *British Journal of Psychiatry,* 193(5), 364-372. doi:10.1192/bjp.bp.107.044461

Mottram, P. G. (2007). *Her Majesty’s Prisons Liverpool, Styal and Hindley. Study Report*. University of Liverpool, Liverpool.

NICE. (2014). *Autism spectrum disorder in adults: diagnosis and management. Clinical guideline [CG142]* Published date: June 2012 Last updated: August 2016. www.nice.org.uk/guidance/cg142

Özdemir, T., & Eyduran, E. (2005). Comparison of Chi-Square and likelihood ratio Chi-Square tests: Power of test. *Journal of Applied Sciences Research,* 1(2), 242-244. http://www.aensiweb.com/old/jasr/jasr/242-244.pdf

Pettersson, A., Modin, S., Wahlstrom R., af Winklefelt Hammarberg, S., & Krakau I. (2018).The Mini-International Neuropsychiatric Interview is useful and well accepted as part of the clinical assessment for depression and anxiety in primary acre: a mixed-methods study. *BMC Family Practice*,19:19.

Prisons and Probation Ombudsman. (2016). *Learning from PPO investigations Prisoner Mental Health,* January 2016, London

Robinson, L., Spencer, M. D.,Thomson, L. D., Stanfield, A. C., Owens, D. G., Hall, J., & Johnstone, E. C. (2012). Evaluation of a screening instrument for autism spectrum disorders in prisoners. *PLoS One,* 7(5), e36078.

Roaldset, J. O., Linaker, O. M., & Bjørkly, S. (2012). Predictive validity of the MINI suicidal scale for self-harm in acute psychiatry: a prospective study of the first year after discharge. *Archives of Suicide Research,* 16(4), 287-302.

Roos, L., Sareen, J., & Bolton, J. M. (2013). Suicide risk assessment tools, predictive validity findings and utility today: time for a revamp?. *Neuropsychiatry,* 3(5), 483.

Segers, M., and Rawana, J. (2014). What do we know about suicidality in autism spectrum disorders? A systematic review. Autis*m Research;*7:507-21.

Spain, D., Sin, J., Chalder, T., Murphy, D., & Happe, F. (2015). Cognitive behaviour therapy for adults with autism spectrum disorders and psychiatric co-morbidity: A review. *Research in Autism Spectrum Disorders,* 9, 151-162.

Taggart, L,. & Chaplin, E. (2014) Substance abuse, Ch. 14, pp 205-226 In *Handbook of Psychopathology in Intellectual Disability* (Tsakanikos, E. and McCarthy, J. Eds.) Springer, New York

Underwood, L., Forrester, A., Chaplin, E. and McCarthy, J. (2013). Prisoners with neurodevelopmental disorders, *Journal of Intellectual Disabilities & Offending Behaviour*, 4 (1-2), pp. 17-23.

Ustun, B., Adler, LA., Rudin, C., Faraone, SV., Spencer,TJ., Berglund, P, et al. (2017). The world health organization adult attention-deficit/hyperactivity disorder self-report screening scale for DSM-5. *JAMA Psychiatry,* 74, 520–6

Van Vliet, I. M., & De Beurs, E. (2007). The MINI-International Neuropsychiatric Interview. A brief structured diagnostic psychiatric interview for DSM-IV en ICD-10 psychiatric disorders. *Tijdschrift voor psychiatrie*, 49(6), 393-397.

Westmoreland, P., Gunter, T., Loveless, P., Allen, J., Sieleni, B. and Black, D.W., (2010). Attention deficit hyperactivity disorder in men and women newly committed to prison: clinical characteristics, psychiatric comorbidity, and quality of life. *International Journal of Offender Therapy and Comparative Criminology,* 54(3), pp.361-377.

Young, S. J., Adamou, M., Bolea, B., Gudjonsson, G.H., Müller, U., Pitts M. et al. (2011). The identification and management of ADHD offenders within the criminal justice system: a consensus statement from the UK Adult ADHD Network and criminal justice agencies. *BMC Psychiatry,* 11, 32.

Young, S., González, R. A., Mullens, H., Mutch, L., Malet-Lambert, I., & Gudjonsson, G. H. (2017). Neurodevelopmental disorders in prison inmates: comorbidity and combined associations with psychiatric symptoms and behavioural disturbance. *Psychiatry research*, 261, 109-115.

**Table 1: Age and Ethnicity of Prisoners with and without neurodevelopmental difficulties**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | No neuro- developmental difficulties  n= (69) | Neuro-developmental difficulties n= (69) | Chi Square Likelihood Ratio Statistics  \* Significant |
| Age in 10yr intervals | 20-29 | 25 (36.2%) | 38 (55.7%) | *X*23= (n=138) 7.35, *P* = .062 |
| 30-39 | 19 (27.5%) | 16 (22.9%) |  |
| 40-49 | 17 (24.6%) | 17 (19.5%) |  |
| 50+ | 8 (11.6%) | 2 (2.3%) |  |
| Ethnicity | White | 31 (44.9%) | 55 (78.6%) | *X*22= (*N*=138) 17.05 *P* <.001\* |
| Black | 31 (44.9%) | 11 (15.7%) |  |
| Asian | 7 (10.1%) | 4 (5.7%) |  |

**Table 2: Comparison of offence types between prisoners with and without neurodevelopmental difficulties**

|  |  |  |  |
| --- | --- | --- | --- |
| Offence Type | No neuro-developmental difficulties (n=65) | Neuro-developmental  difficulties  (n=64) | Chi Square Likelihood Ratio Statistics  \* Significant |
| Robbery | 2 (3.1%) | 7 (10.9%) | X2\* = 3.23, *P* =.080 |
| Fraud and Forgery | 2 (3.1%) | 0 (0%) | X2 = 2.77, *P* = .096 |
| Motoring | 1 (1.5%) | 2 (3.1%) | X2 = 0.36, *P* = .546 |
| Theft and handling | 4 (6.2%) | 4 (6.3%) | X2 = 0.001, *P* = .982 |
| Sexual Offences | 13 (20%) | 24 (37.5%) | X2 = 4.88, *P* = .027\* |
| Violence against the person | 15 (23.1%) | 7 (10.69%) | X2 = 3.43, *P* = .064 |
| Burglary | 7 (10.8%) | 12 (8.8%) | X2 = 1.65, *P* = .199 |
| Drug Offences | 11 (16.9%) | 3 (4.7%) | X2 = 5.28, *P* = .022\* |

\* one degree of freedom and sample size of 129 in each line

**Table 3: Comparison of suicide related behaviours and other self-harm between men with and without neurodevelopmental difficulties**

|  |  |  |  |
| --- | --- | --- | --- |
| Suicide related behaviours & self-harm  in the last month unless stated otherwise | No Neuro-developmental difficulties  (n=69) | Neuro-developmental difficulties  (n=69) | Chi Square Likelihood Ratio Statistics  \* Significant |
| High ‘suicidality’ rating | 3 (4.3%) | 15 (21.7%) | X2\* = 9.93, *P* <.002\* |
| Moderate ‘suicidality rating’ | 4 (5.8%) | 21 (30.4%) | X2 = 15.24, *P* <.001\* |
| Low ‘suicidality rating’ | 18 (26.1%) | 50 72.5%) | X2 = 30.86, *P* =.001\* |
| Thoughts about self-harm | 3 (4.3%) | 18 (26.5%) | X2 = 14.09, *P* = .001\* |
| Actual self-harm | 9, (13%) | 1 (1.4%) | X2 = 7.82, *P* <.005\* |
| Thoughts about suicide | 3 (4.3%) | 17 (25.0%) | X2 = 12.74, *P* <.001\* |
| Attempted suicide | 0 (0%) | 4 (5.9%) | X2 =5.73, *P* <.017\* |
| Suicide attempts (Lifetime) | 0 (0%) | 4 (5.9%) | X2 = 4.18, *P* <.041\* |

\* one degree of freedom and sample size of 134 in each line

**Table 4: Comparison of comorbidity and likelihood of other mental disorder between men with and without neurodevelopmental difficulties (NDs)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Current Mental Health Problem | No NDs (n=69) | ND +ve screen (n=69) | Chi Square Statistics-No ND vs ND +ve screen\* Significant | More than one ND (n=36) | Chi Square Likelihood Ratio Statistics-No NDs vs. More than one NDs  \* Significant |
| Psychosis  F20-F29 | 1 (1.4%) | 6 (8.7%) | X2\*\* = 4.15, *P* <0.042\* | 4 (11.1%) | X2\*\*\* = 3.63, *P* <.031\* |
|  |  |  |  |  |  |
| Affective disorders  F30-39 |  |  |  |  |  |
| Depression | 2 (2.9%) | 15 (21.7%) | X2 = 12.65, *P* = 0.000\* | 11 (30.6%) | X2 = 16.21, *P* <.001\* |
| Major depression with psychotic features | 2 (2.9%) | 4 (5.8%) | X2 = 0.710, *P* =0 .399 | 4 (11.1%) | X2 = 2.78, *P* = .096 |
| Mania or Hypomania | 3 (4.3%) | 19 (27.5%) | X2 = 15.19, P = 0.000\* | 13 (36.1%) | X2 = 17.86, *P* <.001\* |
| F40-49 |  |  |  |  |  |
| GAD | 3 (4.3%) | 18 (26.1%) | X2 = 13.82, *P* = 0.000\* | 11 (30.6%) | X2 = 13.46, *P* <.001\* |
| Social Phobia | 3 (4.3%) | 21 (30.4%) | X2 = 18.04, *P* = 0.000\* | 14 (38.9%) | X2 = 20.20, *P* <.001\*\* |
| Obsessive compulsive disorder | 4 (5.8%) | 13 (18.8%) | X2 = 5.69, *P* <0.017\* | 8 (22.2%) | X2 = 5.95, *P* <.015\* |
| Post-traumatic stress disorder (PTSD) | 4 (5.8%) | 8 (11.6%) | X2 = 1.49, *P* = 0.223 | 7 (19.4%) | X2 = 4.42, *P* <..035\* |
| Antisocial Personality Disorder | 16 (23.2%) | 44 (63.8%) | X2 = 23.87, *P* = 0.000\* | 24 (66.7%) | X2 = 18.99, *P* <.001\* |

\*8one degree of freedom and sample size of 138 in each line

\*\*8 one degree of freedom and sample size of 105 in each line

**Table 5:**  **Comparison of alcohol and drug use between men with and without neurodevelopmental difficulties**

|  |  |  |  |
| --- | --- | --- | --- |
| **Alcohol and drug use** | **No Neuro-developmental difficulties**  **(n=69)** | **Neuro-developmental difficulties**  **(n=69)** | ***Statistics*** |
| Current alcohol dependence | 7, (10.1%) | 17, (24.6%) | *X*2= (1, *N*=134) = 5.044, *P* <.025 |
| Current Alcohol abuse | 2, (2.9%) | 2, (2.9%) | *X*2= (1, *N*=134) = 0.000, *P* = 1.00 |
| Current substance dependence | 12, (17.4%) | 23, (33.3%) | *X*2= (1, *N*=134) = 11.338, *P*<.001 |
| Current Substance abuse | 4, (5.8%) | 4, (5.8%) | *X2*= (1, N=134) = 0.000, *p*= 1.00 |

**Figure 1: Rates of comorbidity between the neurodevelopmental difficulties**

Key: ASD = Autistic Spectrum Disorder, ADHD = Attentional Deficit Hyperactivity Disorder and ID = Intellectual Disability