



The association between neuropsychological performance and self-reported traumatic brain injury in a sample of adult male prisoners in the UK

This study set out to investigate whether self-reporting of Traumatic Brain Injury (TBI) was associated with impaired cognitive function and thereby determine the validity of a brain injury screening index (BISI) to identify prisoners with brain injury.

The study revealed that self-reporting of TBI is consistently associated with neuropsychological and neurobehavioural disability.

The findings thereby reinforce previous self-report studies and validate the use of the BISI to identify cognitive impairment related to brain injury.

This study, the largest in the UK to examine traumatic brain injury (TBI) and cognitive function in adult male prisoners, showed that almost half (47%) of the 613 men screened on admission to HMP Leeds reported a history of TBI.

The majority (70%) of offenders reported receiving their first injury prior to their first offence, reinforcing previous studies that TBI may be a risk factor for offending.

In comparison to a matched control group reporting no history of TBI, those offenders who reported a TBI were significantly younger at the time of their first offence.

In addition those who reported a TBI were more likely to have committed a violent offence.

Those reporting a TBI showed that their intellectual functioning was significantly poorer and was directly associated with severity of injury.

The TBI group also showed higher rates of aggression, apathy, memory problems, disinhibition and higher levels of anxiety and depression alongside their reduced executive functioning. These are all areas that could significantly impact a person's ability to engage in offence related rehabilitation programmes.

Routine screening, using the BISI, together with staff training and effective management and support, could therefore prove vital to reducing recidivism as well as improving the health and well-being of significant numbers of offenders with a history of TBI.

Research findings

The study sought to investigate the relationship between the presence and severity of self-reported traumatic brain injury (TBI), and the cognitive, behavioural and emotional presentation. The study tested the Brain Injury Screening Index (BISI), designed by The Disabilities Trust Foundation for use within custodial settings as a valid and simple way to identify offenders with a history of TBI.

The BISI asks each respondent *whether they had ever suffered a serious blow to their head that had rendered them very dazed or confused* which is a widely recognised indicator of TBI. Respondents were also asked how many times they had suffered such blows and what treatment they received following the injury. Injuries were then identified as being either mild, moderate or severe in nature.



More detailed interviews and assessments were conducted on a sample of offenders identified as having a TBI; and a comparison group of 50 offenders with no history of TBI. The comparison group was matched for age, education, IQ, and alcohol and drug use.

Results of the BISI questionnaire showed that, of 613 consecutive offenders screened using the BISI, 289 (47%) had a history of TBI, suffering a serious blow to the head where they either lost consciousness or felt very dazed or confused.

Interviews with 139 offenders who reported a TBI aimed to establish how accurate the questionnaire had been in identifying the prevalence of TBI, and to examine the range of cognitive, behavioural and emotional symptoms experienced by individuals with a TBI compared to those with no TBI. The length of time a person remained unconscious following a blow to the head is seen as an effective indicator of the severity of the TBI. A mild TBI was defined as no loss of consciousness (LOC) or LOC for less than ten minutes; a moderate TBI as LOC for more than ten minutes but less than six hours and a severe TBI as LOC for longer than six hours.

Results showed that:

- 70% were identified as having a mild TBI
- 23% were identified as having a moderate TBI
- 8% were identified as having a severe TBI
- 70% reported their first TBI happened before their first offence
- 76% of participants had experienced more than one TBI, and of these:
 - 30% had experienced more than 5 TBIs
 - the mean age at which the first TBI was sustained was 18
 - 44% had been in prison on 5 or more occasions
 - almost a third (31%) of the offenders had not reported their injury or sought medical treatment
 - 41% said they had received a TBI through fights, with road accidents (15%) and falls (14%) the other main causes
- 50% of offenders with a history of TBI were using or had used drugs at the time of their arrest
- 60% reported having committed a violent offence, compared with 38% in the control group

Effects of mild TBIs

Although mild TBIs do not normally lead to lasting effects previous research has indicated that more than one mild TBI can have a cumulative effect.

Previous research has suggested that offenders who have sustained a mild TBI (especially several mild TBIs) may find it more difficult to engage with offence-focused rehabilitation due to possibly reduced processing abilities or disinhibited behaviour.¹

It has also been found that those offenders who had experienced a mild TBI reported more instances of TBI, more initial symptoms and more persisting symptoms than those with a history of moderate or severe TBIs.²

Mild injuries are, by their very nature, less likely to be reported to health services, which increases the probability of any resulting problems going unrecognised, diagnosed and untreated.

Impact on nature and frequency of offending

The likelihood of repeat offending also emerged from the questioning among the group of 139 offenders with a history of TBI. Offenders with a brain injury spent more occasions in prison than those in the control group.

Those with a history of TBI were also more likely to report problems across the board with high levels of depression, anxiety, somatic symptoms, memory problems, communication, aggression, motivation / apathy and disinhibition compared to non TBI offenders.

The TBI index

The scores of those offenders with a TBI were collated into a TBI Index. The TBI index is calculated by multiplying the number of injuries by the length of loss of consciousness of the most severe injury. The TBI index has been found to be a useful indicator of TBI severity within the screening questionnaire.

Individuals who had higher TBI index scores reported more problems of memory, aggression, apathy, disinhibition and executive functioning, and also achieved poorer scores in the neuropsychological tests.



Conclusion

Links between TBI and offending, and its impact on an individual's cognitive, emotional and behavioural ability, show the importance of screening offenders and delivering appropriate rehabilitation.

At present there are no simple routine procedures for screening TBI in custody in England and Wales, unlike learning disabilities or mental health, yet our research indicates that nearly half of all prisoners experience a significant history, which directly correlates to reduced cognitive functioning. With a clear association between the results of the BISI and objective measures of neuropsychological functioning, we propose that the screening measure is used routinely throughout criminal justice services in custody and the community to identify offenders with a history of TBI.

Such early identification can ensure those with a TBI, who may be struggling with memory loss, aggression, lack of concentration, anxiety and depression, are offered the right support.

Such help could prove invaluable as part of the challenge of reducing reoffending.

Interventions

Following this research a Disabilities Trust Foundation brain injury Linkworker has been providing support to offenders with a TBI at HMP Leeds. Training for prison staff is also being piloted by the Foundation, drawing on Brain Injury Rehabilitation Trust expertise.

Further research is now taking place using a supplementary questionnaire looking in closer detail at the severity of the problems associated with a TBI.

Background to the study

Previous studies have painted a varied picture of prevalence of TBI among offenders, ranging from 25% to 87%. Recent meta analysis carried out by Shiroma et al (2010) estimated that the prevalence rate of TBI with a loss of consciousness among male offenders was 52%.³

A smaller survey of adult male offenders previously indicated TBI prevalence levels of 60% and also discussed the impact of TBI on the ability to engage in rehabilitation.¹

One study examined the importance of the education of prison staff in the management strategies of offenders with a history of TBI, which could benefit both prisoners and prison staff by potentially decreasing negative interactions.⁴

Methodology

HMP Leeds was chosen for this research because it is a local adult prison for men and has a high number of offenders coming into custody.

The prison is a category B prison with six wings and a maximum capacity of 1212 offenders.

The BISI takes a few minutes to complete and was carried out by a healthcare assistant at the prison as part of standard admission procedures. The 613 offenders who completed the BISI were under no obligation or incentive to take part.

The six issues covered in the BISI were:

- Whether the individual had ever suffered a serious blow to their head that had rendered them unconscious or very dazed or confused
- How many times they had suffered such blows
- What treatment they received
- Whether they had ever been diagnosed with epilepsy or blackouts
- Whether they had any problems with their memory, concentration or speech
- Whether they had ever been diagnosed with ADHD, learning disabilities, mental health problems or brain injury.*

A TBI Index score was created for each participant combining the number of blows to the head (ranging from once to more than five times) with the severity of the injury, based on the longest period of loss of consciousness.

Among those who indicated a history of TBI in the BISI, 139 took part in a structured interview and answered a series of questionnaires. Of those who were interviewed, 103 underwent a neuropsychological assessment. The comparison group of 50 offenders with no history of TBI undertook the same interview, questionnaires and neuropsychological assessment.

The structured interview was carried out by a psychology graduate, under the supervision of a Consultant Clinical Neuropsychologist, and involved 38 questions focusing on the offenders' social background, offending history, record of substance misuse and history of TBI.



Participants completed several standardised questionnaires:

- Neurobehavioral Functioning Inventory (NFI) to identify depression, physical health problems, memory loss, communication, aggression and motor problems
- Frontal Systems Behaviour Scale (FrsBe) to identify apathy, disinhibition and executive dysfunction
- Dysexecutive Questionnaire (DEX)
- Beck's Anxiety Inventory (BAI)
- Beck's Depression Inventory (BDI)
- General Health Questionnaire (GHQ-12) to identify psychological distress. Higher scores indicate an increased likelihood of psychiatric disorder, psychological distress and decreased social functioning.

Standardised neuropsychological tests administered included:

- the Test of Premorbid Functioning (TOPF) (a measure of pre-morbid functioning)
- the Wechsler Abbreviated Intelligence Scale (WASI) (a short-form measure of intellectual functioning)
- the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) (a brief examination of immediate memory, delayed memory, language abilities, visuo-spatial abilities and attention abilities)
- Behavioural Assessment of the Dysexecutive Syndrome (BADS) (a battery of tests designed to assess the effects of executive functioning).

*The BISI has since been revised. Contact the Foundation to obtain the most up-to-date version.

Authors

Dr Ivan Pitman, Consultant Clinical Neuropsychologist
Claire Haddlesey, Research Assistant
Sara da Silva Ramos, Research Fellow
Michael Oddy, Consultant Clinical Neuropsychologist
Deborah Fortescue, Head of Foundation

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Further Information

The Disabilities Trust
32 Market Place
Burgess Hill
West Sussex RH15 9NP
Tel [01444 239123](tel:01444239123)
Email foundation@thedtgroup.org
Twitter [@theDTgroup](https://twitter.com/theDTgroup)

