Knowledge about head injury in prison officers and implications for training

Dr Roisin Jack *is a senior clinical psychologist in NHS Grampian who works with people with acquired brain injury.* ***Dr Louise Buchan*** *is a clinical psychologist in NHS Grampian who works with people who have traumatic brain injury.* ***Julia Heeren*** *is an assistant psychologist in NHS Grampian.* ***Professor Tom McMillan*** *is at the University of Glasgow and leads a programme developing evidence-based services and training for people with brain injury in the Criminal Justice System in Scotland.*

There is growing interest in the relationships between the neurobehavioural effects of head injury and offending, including evidence for associations with violent and more serious crime leading to imprisonment.[1 2] A head injury can cause significant traumatic brain injury, but with no obvious physical signs. Damage most commonly arises from diffuse brain injury that results from rapid acceleration or deceleration of the brain with shearing forces causing neuronal damage. The most common causes are falls, assault and motor vehicle accidents.[3] On casual acquaintance, an individual can seem to talk and act normally after traumatic brain injury, but there can be important emotional, cognitive and behavioural changes that can lead to poorer self-control and judgement, a lower threshold for anger and violence and greater likelihood of acting impulsively.[4] People with a history of significant head injury who are in prison are likely to be more difficult to manage and have more recorded prison incidents, yet staff are often not aware of this and have little knowledge of this. There are also indications that these prisoners receive little or no support for the effects of their head injury while they are in prison.[5 6 7] Meta-analyses suggest that more than half of people in prison have a life history of head injury, and arguably there is a compelling need for staff to have knowledge about this to best manage them and support their needs.[8]

Few studies have considered knowledge about head injury held by professionals who work in the Criminal Justice System (CJS), and none concern prison officers.[9] This paucity of studies persists despite long standing concerns by professionals who work with people with head injury over misperceptions about the effects on sufferers.[10 11 12] This seems especially relevant in settings where head injury risk and rates are higher than elsewhere, such as in prison settings compared with the general population.[13]

The few studies examining knowledge about head injury that have been published report a need for

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11. Hux, K., Schram, C. D., & Goeken, T. (2006). Misconceptions about brain injury: A survey replication study. *Brain Injury, 20*, 547–553
12. Swift, T. L., & Wilson, S. L. (2001). Misconceptions about brain injury among the general public and non-expert health professionals: An exploratory study. *Brain Injury, 15,* 149–165
13. McMillan, T. M., Graham, L., Pell, J. P., McConnachie, A., & Mackay, D. F. (2019). The lifetime prevalence of hospitalised head injury in Scottish prisons: A population study. *PLoS ONE, 14*(1), e0210427

additional staff training. For example a survey of healthcare professionals in US correctional facilities showed that two thirds felt they did not have sufficient training to work with incarcerated individuals with head injury,[14] and a need for further training was also evident in a study on professionals in the Probation Service in Northern Ireland.[15] Participants in these studies frequently held misconceptions about unconsciousness, memory and recovery after head injury, and demonstrated a lack of awareness of its effects.

In the present survey, prison officers in Scotland were asked about their training needs in relation to head injury, and associated with this, their knowledge about head injury was assessed. It is anticipated that the present survey will support and inform the development of educational resources for prison officers in the future. Linked to our findings, we provide specific examples of the practical utility of such training in the Discussion section. We use the term 'head injury' rather than 'traumatic brain injury' as the former is more cautious and does not assume that there has been damage to the brain when a knock to the head has been reported but is yet to be fully assessed.

Many prisoners have a history of head injury and staff need to know how to manage and support them.

Methods and setting

The survey took place at HMP and YOI Grampian in the north of Scotland between August 2022 and March 2023. The facility has capacity for about 550 prisoners. It holds a wide range of convicted and untried male and female adult prisoners, including people serving life sentences and who have breached community orders. To maximise the number of survey returns, two options for completion were offered: 1) paper copies were provided to staff to complete in prison reception, in the prison halls (similar to prison wings) or after Scottish Prison Service (SPS) officer training sessions (with return envelopes provided), and 2) an online link was emailed to all SPS officers at the prison. The survey took about 5-10 minutes to complete and all data were provided anonymously. Members of the research team did not assist officers in completing the survey. In addition, we contacted the SPS to enquire about any training provided about head injury currently or in the past.

Ethics approval

Approval for the survey was obtained from the Deputy Governor of HMP and YOI Grampian. and the SPS Ethics Committee (12.07.23).

Measures

Years of experience and training needs

A brief form developed from that used in a similar study on police custody officers,[16] asked about years of experience as a prison officer and knowledge about head injury (knowledge about head injury in the prison population, including mild head injuries that do not require hospital admission), experience with prisoners with head injury (experience of head injury at the prison, including mild head injuries that did not require hospital admissions) and whether training about head injury in the prison population was needed.

Common misconceptions about traumatic brain injury questionnaire (CM-TBI)

The 20-item version of the CM-TBI, a modified version used previously with probation officers and police custody officers, categorises questions into four domains to examine respondents' misconceptions about recovery from traumatic brain injury (TBI; 8 items), sequelae (effects of TBI; 6 items), insight of someone with TBI into its effects (3 items) and hidden injury associated with TBI (3 items).[17] [18] [19] After completion, respondents' answers are scored 1 if they answered the item correctly, and 0 if answered incorrectly (i.e., they hold a misconception). The questionnaire has good internal consistency (.84) and test-retest reliability (.82).

14. Yuhasz, J. E. (2013). Misconceptions about traumatic brain injury among correctional health care professionals. *Journal of Correctional Health Care, 19,* 135–143
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16. McMillan, T. M. (2022). Knowledge about head injury in police custody staff and implications for training. *Forensic Science International: Mind and Law,* 100105.
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18. O'Rourke, C., Linden, M., & Lohan, M. (2018). Misconceptions about traumatic brain injury among probation services. *Disability and Rehabilitation, 40*(10), 1119-1126.
19. See footnote 16: McMillan (2022).

Results

Ninety-nine people completed the survey out of a possible 240 SPS officers (a 41 per cent response rate).

Background and experience

All participants returned the Years of Experience and Training Needs form. The average number of years of service as a prison officer was 9.4 (SD 8.7; range 0-34). More than two thirds reported that they did not have knowledge about head injury (69 per cent), although almost half (42 per cent) indicated that they had experience of working with people with head injury in prisons. Two thirds reported that they would like to learn more about head injury (68 per cent).

Officers were also given opportunity to write comments or indicate relevant experiences they had. Of the 14 respondents who provided this additional information, five said they had personal experience of working with head injury in their previous employment, or with family or friends. Four reported having experience of of working with head injury in a prison context. Five noted a need for training about head injury, feeling it was very relevant to their work. One had some knowledge about head injury from an undergraduate psychology course. No respondents reported receiving prior training on the topic of head injury.

Knowledge about head injury

On the CM-TBI there were missing data for only 10/1980 possible responses. These related to nine different questions and four participants. Given that there were no systematic omissions we interpreted this as uncertainty on behalf of the respondent and coded the missing data as errors. Scores on the CM-TBI questionnaire (Mdn 17; IQR 16, 19) ranged from 67 per cent to 100 per cent correct, with 83 per cent of participants making one or more error — i.e., answering a question incorrectly/demonstrating a miconception about TBI. The domain for each question has been included in Table 1 (below) for information (but was not present in the version given to participants). To enable comparisons between domains, which comprised differing numbers of questionnaire items, the total number of errors for all questions in each domain in the sample was divided by the number of questions in each domain. This provides the number of errors per question for each domain. There were 27.3 errors per question for insight, 15.7 for sequelae, 3.0 for hidden disability and 10.3 for recovery. Hence errors for insight were most common, and more than half of participants (55 per cent) made at least one error within this domain. Total scores on the CM-TBI were not associated with years of experience of prison work ($r = -.139$, $p = .171$).

Table 1. *Percentage of SPS participants making errors on CM-TBI questions (n=99). Domain of question has been added in brackets.*

Item	Question	Participant errors (per cent)
1	A head injury can cause brain damage even if the individual is not knocked unconscious (hidden injury)	0
2	Whiplash injuries can cause brain damage even if there is no direct blow to the head (hidden injury)	8
3	It is common for people with brain injuries to be easily angered (sequelae)	25
4	It is common for personality to change after a brain injury (sequelae)	8
5	Problems with speech, coordination, and walking can be caused by brain damage (hidden injury)	2
6	Problems with irritability and difficulties controlling anger are common in people who had a brain injury (sequelae)	16
7	Most people with brain damage are not fully aware of its effect on their behaviour (sequelae)	20
8	People who have survived a brain injury usually show a good understanding of their problems because they experience them every day (insight)	33
9	Brain injuries often cause a person to feel depressed, sad, and hopeless (sequelae)	28

10	It is common for people to experience changes in behaviour after a brain injury (sequelae)	3
11	Sometimes a second blow to the head can help a person remember things that were forgotten (recovery)	15
12	Recovery from a brain injury is usually complete in about 5 months (recovery)	7
13	Once a person is able to walk again, his/her brain is almost fully recovered (recovery)	5
14	Once a person with a brain injury realizes their degree of impairment they will always be aware of this (insight)	19
15	A person who has a brain injury will be 'just like new' in several months (recovery)	2
16	Asking people who were brain injured about their progress is the most accurate, informative way to find out how they have progressed (insight)	33
17	It is good advice to remain completely inactive during recovery from a brain injury (recovery)	8
18	Once a person recovering from a brain injury feels 'back to normal,' the recovery process is complete (recovery)	5
19	How quickly a person recovers depends mainly on how hard they work at recovering (recovery)	17
20	The primary goal of brain injury rehabilitation is to increase physical abilities such as walking (recovery)	31

Discussion

The findings indicate that for this sample of SPS officers, who range in prison service employment from less than 1 year to more than 30, there is both a need and a desire for further knowledge about head injury. Although almost half of the prison officers indicated that they had experience of working with people with head injury in prisons, two thirds reported that they did not have knowledge or training about head injury, and two thirds reported that they would like to know more. The SPS indicated that there has not been any specific staff training provided on head injury beyond the actions required in an acute emergency and first aid training. Although there is little published research on training about head injury for criminal justice staff, the literature that does exist reflects similar themes. Two thirds of healthcare workers across a wider range of correctional institutes in the US reported a need for training about head injury,[20] and more than ninety percent of probation workers in Northern Ireland reported having no formal training on head injury.[21] In Scotland, shortfalls in training about head injury have been reported in police custody officers,[22] and training needs for criminal justice social workers have been identified.[23]

More specific needs for training are supported by the responses on the CM-TBI in our study. The pattern of responses suggest that there are important misconceptions amongst staff about the effects of head injury. Errors in the domain of insight were most common, with more than half of participants making one or more error. Of interest, police custody officers in Scotland were also found to have higher error rates on questions pertaining to similar issues (e.g., CM-TBI questions 8, 9, 16, and 20), and more than half made errors on questions pertaining to insight.[24] Misconceptions about insight were also highlighted as being most common in a similar study with probation workers.[25] A lack of insight as a result of head injury in people in prison means that there is poor awareness of the potential limitations and risks arising from such injury. This means that allowances cannot be made, alternative behaviours that could avoid a negative

20. See footnote 14: Yuhasz (2013).
21. See footnote 15: O'Rourke et al. (2018).
22. See footnote 16: McMillan (2022).
23. De Mora, H., McFarlane, J., & McMillan, T. M. (2024) Prevalence of head injury and associated disability in individuals undergoing pre-sentencing assessment by Criminal Justice Social Work. F*orensic Science International: Mind and Law, 5*, 100029.
24. See footnote 16: McMillan (2022).
25. See footnote 15: O'Rourke et al. (2018).

outcome may not be considered, others may be blamed for outcomes of events and 'insightless' behaviour is more likely to be repeated. An example could be an anger outburst leading to violence following misinterpretation of what someone has said. Here, there is a lack of awareness that the head injury has reduced the threshold for anger and possibly that errors in interpreting social cues and behaviour are more likely. With deficits in insight, simple strategies can be employed to detect and defuse irritability at an early stage and to check whether initial perceptions in a social situation are correct. There were also higher rates of misperceptions on questions about effects of head injury on anger and mood, and a view that rehabilitation primarily focusses on physical difficulties, whereas persisting disability after head injury largely results from cognitive and emotional difficulties. With further knowledge and training, a prison officer could support a prisoner with head injury by informing them about effects and simple strategies and/or directing them to education about head injury in prison.[26]

In addition to emergency care, there are two main scenarios where knowledge about head injury in prisoners is necessary. The first pertains to recent head injury, for example after a hospital assessment and then return to the care of the prison or if the prisoner is behaving oddly and they may have had a knock to the head. In these situations, it is possible that the prisoner has post traumatic amnesia (PTA). Prisoners with PTA will often have normal physical function and be able to talk fluently and walk and carry out motor tasks such as eating and drinking. However they may be disoriented in time, place and person with amnesia for recent events. Often associated with this is confusion, and increased irritability with poor insight and awareness of such difficulties. They may not be able to recall recent events or give a reliable account. They may confabulate and/or present with increasing paranoid ideation. In this state they can give a false account of events without the intention to deceive and which they believe to be true. During PTA they may not think they are in a prison and want to leave for work or think they are at work and become aggressive if thwarted in attempts to behave in ways they think is consistent with this perception. They may not recognise people known to them, or misrecognise strangers as friends or family. There can also be amnesia for memories prior to the head injury (retrograde amnesia). PTA is a transitory phenomenon and can last for seconds, minutes, hours or longer. The individual may remember nothing of their time in PTA or can have 'islands' of memory, which are isolated memories 'in a sea of amnesia'.[27] PTA is rarely assessed in hospitals in the UK, but clearly has implications for management, and could easily lead to misperceptions of a person in prison as seeming to be deceitful, unreasonably aggressive, purposefully difficult or non-compliant. It should be routinely assessed in prison when a head injury has occurred recently. In fact hospital staff may expect that there will be monitoring of sequelae of the head injury on discharge back to the prison, but it is more likely that the prisoner will simply be returned to normal prison routines and any persisting effects including PTA may not be considered in the context of management or support. In the present study, the emphasis prison officers appear to place on physical effects as the primary focus of rehabilitation, makes this more likely as physical effects may not be evident in people who are in PTA.

> Prison officers had misconceptions about head injury that could have an important impact on the management and support of prisoners.

The second scenario pertains to people in prison who have a significant past history of head injury. This can result from having had a severe and disabling head injury or repeated mild head injuries over a period of time. More than half of people in prison are not only likely to have a history of head injury, [28] but also a history of repeated head injury.[29 30 31] Prisoners with such histories are more likely to be involved in recorded

26. Buchan, L., & McMillan, T. M. (2022). Prisoner Knowledge about Head Injury is Improved by brief psychoeducation. *Brain Injury, 36*(3), 401-405.
27. McMillan, T. M. (2015). Post traumatic amnesia. In J. D. Wright (Ed.), *International Encyclopedia of Social and Behavioral Sciences* (2nd ed., pp. 636-639). Elsevier.
28. See footnote 8: Hunter et al. (2023).
29. Schofield, P. W., Butler., T. G, Hollis, S. J., Smith, N. E., Lee, S. J., & Kelso, W. M. (2006). Traumatic brain injury among Australian prisoners: Rates, recurrence and sequelae, *Brain. Injury, 20,* 5, 499-506
30. Williams, W. H., Cordan, G., Mewse, A. J., Tonks, J., & Burgess, C. N. (2010). Self-reported traumatic brain injury in male young offenders: A risk factor for re-offending, poor mental health and violence? *Neuropsycholgical Rehabilitation, 20*(6), 801-812
31. See footnote 13: McMillan et al. (2019).

incidents in prison, can have more difficulty in settling into prison life and are more likely to reoffend.[32 33 34.] The limited awareness that prison officers have about the consequences of head injury, such as limited insight and emotional effects, would make it more difficult for them to support prisoners with a history of head injury, including the prisoner's personal officer who has a particular role here. Overall, this may result in the prisoner not adjusting as well to the prison regime and to them benefiting less from opportunities such as education or other activities.

There is a need for training with respect to both of the above scenarios. This alone would be useful for prison officers when someone with a history of recent or long standing head injury is identified by them or others. A systematic process of identification may be more difficult to achieve, particularly with respect to the second scenario. There are three main reasons for this. First, health history may not be passed through different stages in the CJS, hence identification of difficulties related to head injury may not be received by prison officers. Second, a significant proportion of people with significant head injury who are involved in the CJS do not attend hospital, hence there may be no NHS record to be found. Third, there is no routine question about history of head injury in the NHS reception interview in prisons. Finally, when identification of significant head injury occurs, there is also a need to facilitate information sharing between staff groups within stages of the CJS such as prisons.

The present study is primarily limited by the absence of data to enable an understanding of whether the sample is representative of the wider prison officer workforce in Scotland. We also cannot determine whether there was any bias due to self-selection. The CM-TBI questionnaire was not specifically designed for a criminal justice setting, and this may be a limitation. It does though have the advantage of having been used with other relevant professional groups facilitating comparisons with these studies.

It is recommended that training on the effects of recent and historical head injury is developed for prison officers and that this includes coverage on effects relating to insight, emotion, cognition and behaviour. The training should be easily accessible and regularly updated. In relation to this, a training module about head injury for prison officers is currently being developed by the SPS in collaboration with the University of Glasgow. Four e-modules aimed at NHS staff, but relevant for other staff groups are now available on the NHS Education Scotland TURAS website.

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32. Shiroma, E. J., Pickelsimer, E. E., Ferguson, P. L, Gebregziabher, M., Lattimore, P. K., Nicholas, J. S., Dukes, T., & Hunt, K. J. (2010). Association of medically attended traumatic brain injury and in-prison behavioral infractions: A statewide longitudinal study. J*ournal of Correctional Health Care, 16*(4), 273–286.
33. See footnote 6: Matheson et al. (2020).
34. McMillan, T. M., McVean, J., Aslam, H., & Barry, S. J. E. (2023). Associations between significant head injury in male juveniles in prison in Scotland UK and cognitive function, disability and crime: A cross sectional study. *PLOS ONE, 18(*7), e0287312.