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# Prisoner knowledge about head injury is Improved by brief psychoeducation

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## ABSTRACT

**Introduction:** The high prevalence of head injury (HI) in prisoners and its association with offending indicates a need for interventions. However, there is little evidence and none for the effectiveness of psychoeducation in improving prisoner knowledge about HI and its effects.

**Methods:** Small groups of males in two Scottish prisons underwent a 1 hour psychoeducation session delivered by PowerPoint and combined with question and answer, video clips and a booklet about HI. A pre-post intervention design was used to assess knowledge about HI from vignettes. Participants indicated effects of HI using unprompted free recall and then with a questionnaire (the Symptom Checklist; SCL), pre-education ( $n = 34$ ), post-education ( $n = 19$ ) and at 4-week follow-up ( $n = 11$ ). Free recall was scored using symptom lists from national guidelines (FR-SIGN) or the SCL (FR-SCL). Within-subject comparisons were made between pre-intervention, post-intervention and follow-up scores.

**Results:** Knowledge about HI significantly increased pre- to post-education for FR-SIGN ( $d = 0.91$ ; 95% CI 0.62, 2.53) and FR-SCL ( $d = 0.99$ ; 95% CI 0.95, 4.00) without decrement at follow-up (FR-SIGN  $d = 1.27$ ; 95% CI 0.53, 2.56; FR-SCL  $r = 0.60$ ). Scores on the SCL did not change over time ( $p > .05$ ).

**Conclusion:** Prisoner knowledge about HI was improved by brief psychoeducation suitable for delivery in prisons.

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## Introduction

A history of head injury (HI) in offenders can be associated with mental health and drug problems, greater risk of violence, infractions in prison and recidivism (1). Meta-analyses suggest that the prevalence of HI in offenders is around 50–60% (2,3) including a high prevalence of repeated mild HI (4). This suggests a need for education, management and rehabilitation in the criminal justice system about the causes and effects of HI, the potential for cumulative effects of repeat HI and the association with offending (5,6).

Neurobehavioural effects of HI such as impatience, intolerance, impulsivity and irritability are associated with difficulties in self-regulation and social judgment and an increased risk of antisocial behavior (7) including aggression and violence and with this a heightened risk of involvement with the criminal justice system (1). Indeed, a study on the general population in Sweden, found a three-fold greater risk of violent crime in people with a history of HI than in age and gender matched controls (8) and others report associations between a history of HI and criminal convictions (9,10).

Whilst evidence-based guidelines for the general population recommend routine provision of information and advice on early symptom management in the acute phase following HI (11), the provision of such information does not mean that an individual will read, retain and subsequently benefit from such information (12). Furthermore, as offenders often do not attend hospital after sustaining a HI (13), they may have little or no exposure to information of this kind. Studies that have

investigated knowledge about HI and its effects more generally find this to be poor, not only in the lay public but in those with a history of mild HI (14,15).

Research on the utility of education programmes about HI for prisoners have not been published (16). However, brief educational interventions in a prison setting have been shown to improve prisoner knowledge in other areas, including opioid overdose (17), HIV (18–20) and hepatitis (21,22) and interventions involving education can translate to health improvement in prisoners (23). A systematic review identified aggression, irritability, agitation and alcohol and drug misuse as being associated with HI (24), and it is widely accepted that tolerance to intoxicants is reduced after HI and when combined with impulsive behaviors associated with HI, the likelihood of repeated HI and offending is increased (5). Hence education about HI which incorporates information on alcohol and drugs, aggression and impulsivity seems important in a brief intervention in a prison population.

The present study examines the effectiveness of a brief psychoeducation intervention in a prison setting. The term ‘head injury’ is used rather than ‘traumatic brain injury’ because assessment relied on self-report, and often injuries were reported as mild but without hospital attendance, making it uncertain whether brain injury was sustained. The term offender is used here in accordance with current usage in the criminal justice system and for reasons of clarity and is not intended to be derogatory.

## Design

A quantitative between groups and within-subjects design. Suitability to take part in the study and knowledge about HI was assessed. Prisoners then attended a 1-hour interactive group psychoeducation training session delivered by LB within a month of the pre-education assessment. Knowledge about HI was reassessed immediately after the education session and at 1-month follow-up.

## Methods

The project took place in Her Majesty's Prison (HMP) Low Moss and HMP Young Offenders Institute, Grampian in Scotland.

## Eligibility

Prisoners were included if male, aged 18 or over, having basic literacy skills, if fluent in English, able to provide consent and having no diagnosis of a cerebral degenerative disease or severe mental disorder. Females were not included because the number was too small to consider gender differences. Prisoners who were able to complete the pre-group measures independently or with provision of adaptive or additional support from the researcher were considered to have met inclusion criteria to take part.

## Recruitment

Posters were distributed within prison halls and prisoners who were interested in taking part posted a notification of interest sheet in the National Health Service medical referral box that is provided in each hall. Participants then met LB on an individual basis for consideration of eligibility and pre-education assessment.

## Psychoeducation (see supplementary file 1)

The session was developed for the study and focused on six topic areas: the effects of head injury on your brain, common causes of head injury, symptoms that often occur after head injury, the effect of drugs and alcohol after head injury, head injury and recidivism and reducing the likelihood of sustaining a head injury. A simple four-step strategy to manage strong emotional responses was incorporated in the intervention. PowerPoint was used for the presentation with accompanying educator notes (supplementary file 1). The group format was interactive to enhance engagement and consolidation of learning. This included group discussions elicited by the following questions; 'What does your brain do?', 'What is the most common cause of HI?', 'What are the different ways you can get a HI?', 'Do the effects of alcohol or drugs change after HI?' and 'Can anyone think of a situation where they have been angry and got their facts wrong?' Prisoners were presented with the list of HI symptoms from the Symptom Checklist (SCL) and invited to raise their hands to indicate whether they had experienced any of these. Foam brain models were used to illustrate anatomical areas vulnerable to damage after head injury.

Permission was obtained from the Scottish Prison Service (SPS) to stream media clips to convey behavior and effects associated with anger, disinhibition and inhibition.

Training was provided to groups of up to five prisoners. Immediately after the session, prisoners were given an information booklet ('Helpful Things to Know About Head Injury') that summarized the psychoeducation session.

## Vignettes

Previous research has used vignettes and symptom checklists to assess knowledge about HI in patients and professionals (14,25). An expert review concluded that future research should use these vignettes or similar because of their compatibility with the WHO definition of mild traumatic brain injury and their readability scores (15). The vignettes in the present studies were based on those from our earlier studies, with modification to be appropriate for a prisoner sample. A different vignette was presented at each time point to reduce learning effects (supplementary file 1). Participants indicated what effects of HI they thought the individual in the vignette was likely to have suffered.

## Measures

**Background and Demographics:** Information about age, years of education, index offense and previous custodial sentences was obtained at the pre-education assessment using a questionnaire designed for the study.

**Head Injury History:** The Ohio State University Traumatic Brain Injury Identification Method (OSU-TBI-ID) is a short structured interview that assesses history of HI by self-report and has been validated in prisoners (26) and used successfully in other studies in HI on prisoners in Scotland (10). The OSU-TBI was used to estimate the worst (most severe) HI and the number of HI sustained. Moderate to severe HI was defined as LoC > 30 minutes and mild as LoC < 30 minutes.

**Outcome Measures:** Knowledge about HI was assessed in three ways. Participants were asked to write down what effects they thought the HI in the vignette would have had. These unprompted responses using free recall were scored in two ways. First as the number of symptoms listed that are found on the Symptom Checklist (FR-SCL (27)) and second as the number of symptoms corresponding to those listed in national guidelines on HI (11,28), i.e. Free Recall-SIGN (FR-SIGN). After the unprompted free recall, participants were asked to use the SCL (27) to indicate effects of HI in the vignette.

## Data analysis

Analyses were carried out using SPSS (version 21). Outcome measures were assessed for normality using the Kolmogorov-Smirnov Test and parametric (paired t-test or Pearson correlation) or non-parametric tests (Wilcoxon Signed Rank Test or Spearman correlation) used as appropriate.

## Ethics approval

NHS Research Ethics (West of Scotland REC 17-WS-0265) and the Scottish Prison Service Ethics Committee gave approval for the study.

## Results

### Recruitment

Fifty prisoners expressed an interest in the study. One did not meet eligibility criteria; one was under sentence protection and unavailable; 13 did not attend the screening assessment because of refusal, ill health, court attendance, work or programme commitments or prison officer unavailability as escorts. The screening assessment was discontinued for one prisoner who found it stressful. Hence, 34 prisoners completed pre-education assessment. Of these, 20 attended the psychoeducation group. Post-education data were not captured for one prisoner who left mid-session due to an unexpected appointment. Eleven participated in follow-up. Drop-outs after the education session were due to prisoners being unavailable, transferred to other establishments or liberated.

### Demographics and offending history (Table 1)

All participants self-assessed as being of white ethnicity, broadly reflecting the ethnic mix in Scottish prisons where 96% of prisoners self-assess as white (29). Five were serving their first custodial sentence. Demographic characteristics and offending history did not differ between mild and moderate-severe HI groups ( $p > .05$ ).

### Head injury characteristics

All participants who were assessed, reported a history of HI ( $n = 33$ ) and all but one, a history of repeat HI (median 4.0, IQR 3.5; range 1–11). Most reported having sustained a HI with LoC (79%; 26/33). The severity of the worst HI was mild (LoC < 30 minutes) in 39% (13/33) and moderate-severe (LoC > 30 minutes) in 39% (13/33). More than half of the participants sustained HI as a result of violence (55%). Other causes were falls (22%), road traffic accidents (15%), sport (4%) and other accidents (6%).

### Experience of HI and knowledge about HI

Pre-education differences in knowledge were not significantly different between those who attended ( $n = 19$ ) or did not ( $n = 15$ ) attend the psychoeducation session (FR-SIGN

$t = .609$ ;  $p = .547$ ; 95% CI  $-1.053, 1.951$ ; FR-SCL  $t = .984$ ;  $p = .333$ ; 95% CI  $-.691, 1.983$ ; SCL  $t = .082$ ;  $p = .935$ ; 95% CI  $-.333, 3.614$ ).

Knowledge about HI did not differ pre-education between participants with mild or moderate-severe HI on any of the three outcome measures ( $p > .05$ ; see [supplementary file 2](#)). Spearman correlations indicated no significant association between the number of HI sustained and knowledge about HI pre-education for FR-SIGN ( $r = .021$ ,  $p = .906$ ), FR-SCL ( $r = -.035$ ,  $p = .836$ ) or SCL ( $r = .177$ ,  $p = .324$ ) scores.

### Change in knowledge about HI after education (Table 2)

More HI symptoms were reported by unprompted free recall for SIGN and SCL post-education than pre-education (FR-SIGN  $t = 3.40$   $p = .003$ ;  $d = 0.99$ , 95% CI 0.95, 4.00; FR-SCL  $t = 3.47$   $p = .003$ ;  $d = 0.91$ ; 95% CI 0.62, 2.53) and at follow-up (FR-SIGN  $z = -2.84$ ,  $p = .005$ ;  $r = 0.60$ ; FR-SCL  $t = 3.40$ ,  $p = .007$ ;  $d = 1.27$ , 95% CI 0.53, 2.56). On the SCL, scores did not differ from pre-education to post-education ( $t = 1.12$ ,  $p = .279$ ; 95% CI  $-0.74, 2.43$ ) or follow-up ( $t = 1.52$ ,  $p = .16$ ; 95% CI  $-0.51, 2.6$ ). The number of symptoms reported post-education and at follow-up did not differ significantly for the FR-SIGN ( $t = -0.61$ ,  $p = .55$ ). FR-SCL ( $t = -0.43$ ,  $p = .68$ ) or (SCL  $t = -0.22$ ,  $p = .83$ ).

### Qualitative feedback

Prisoners were asked for their views on the psychoeducation session at the end of the post-education session. Several reported that the content accounted for symptoms or difficulties they had experienced, but had not attributed to HI. Some prisoners said they were surprised that tolerance to alcohol or drugs could be reduced after HI. One prisoner thought that difficulties he had in engaging in another prison education programme might be explained by cognitive problems resulting from a previous HI injury. All of the prisoners said they enjoyed the video clips as they were humorous and most reported that the videos effectively communicated concepts of anger disinhibition and inhibition.

At follow-up, prisoners were asked about the usefulness of the booklet about HI that they were given. There was a general consensus that it provided a helpful summary of the psychoeducation session. One prisoner said that the booklet helped him to make sense of incidents prior to his custodial sentence. Another reported that he had shared the content with a fellow prisoner in his hall who said it was relevant to him. One prisoner described the psychoeducation session as a 'lightbulb moment' and said he would keep the booklet for future use.

**Table 1.** Demographic characteristics and offending history; mean, (SD) and range or N (%).

	Mild HI N = 20	Mod-Severe HI N = 13*	All participants N = 34
Age (years)	36 (12); 23–66	39 (10); 21–51	38 (11); 21–66
Years of education	11.5 (2.8); 7–19	10.5 (2.9); 6–18	11.2 (2.8); 6–19
Previous convictions	None 4 (20%) 1 to 5 9 (45%) >5 7 (35%)	1 (8%) 8 (61%) 4 (31%)	5 (15%) 18 (55%) 11 (33%)
Violent index offense	11 (55%)	7 (54%)	18 (55%)

\*HI severity unknown for one participant

**Table 2.** Scores for knowledge about head injury at each assessment point; mean (SD).

Measure	Pre-education N = 34	Post-education N = 19	Follow-up N = 11
Free recall-SIGN	1.88 (2.11)	4.16 (3.27)*	4.73 (1.79)*
Free recall-SCL	1.71 (1.90)	3.00 (2.08)*	3.36 (1.03)*
Symptom Checklist	7.59 (4.86)	8.37 (4.61)	9.36 (3.23)

\*difference from pre-education  $p < .05$

## Discussion

Knowledge about HI in unprompted free-recall in prisoners increased after a 1 hour psychoeducation session and the improvement persisted for at least 4 weeks without a significant decrement. It is of interest that past exposure to HI whether mild or moderate-severe or as the number of past HI reported was not associated with knowledge about the effects of HI prior to the education session. This is consistent with the qualitative feedback from prisoners and suggests that they had not appreciated the potential long-term impact of HI. It is also consistent with other studies on knowledge about HI that do not report greater symptom reporting in response to vignettes at free recall in non-offenders with experience of HI (14,15,25,30). The finding of relatively few responses at unprompted free recall compared to the checklist has been reported in several studies in non-offender samples (14,15,30) and may be due to symptom guessing when using a checklist (25).

There is a paucity of research evaluating interventions that target knowledge and awareness of HI (31) and in prisons, little consideration has been given to development of such resources despite the high prevalence of HI (32). Although research on psychoeducation about HI in prisoners has not been published previously, other studies show that a single education session can improve prisoner knowledge about health problems (18,19,22).

Several limitations to the study were linked to study design. The researcher was the sole assessor of the outcome measures and was aware of pre-education scores, giving a potential for bias. The specific content of the intervention that led to improved knowledge is not known; for example, participants may have shared their knowledge after attending the group with other prisoners or conducted personal enquiry about HI after recruitment to the study. The sample size was modest and attrition was high between pre-training and post-education, mostly because participants declined to attend the group. This has been reported in other studies using brief interventions (20). In the present study, prison officers and prisoners reported that declining to participate after showing interest presented prisoners with an opportunity to defy requests by prison staff (who would escort them to the group) without consequence. Negative relationships with frontline prison staff are known to be a barrier to conducting research on prisoners (33). High attrition between post-training and follow-up was due to participants being liberated from prison or to prison management factors and means that results should be considered with caution. Other prison factors which affected participation included court attendance court, hospital appointments, education or work parties and forensic programmes. On occasion, critical risk incidents in the prison prevented the researcher from accessing facilities to meet with participants. Future studies should give consideration to routine administrative practices in prisons that lead to attrition in samples and can be difficult to predict. Despite this, the study demonstrated that an intervention of this kind can provoke initial interest and sufficient attendance for it to be viable as an educational practice in prison.

The information booklet that was given to participants at the end of the group might be developed into a self-help format booklet for distribution within the prison to widen access to the intervention to prisoners who declined attendance whilst providing additional support to those who do. Adapted self-help materials for prisoners can have a positive impact on mental health symptom reporting (34).

Education of the kind used in this study might be woven into larger and more comprehensive programmes in prison that focus on rehabilitation and support for mental health conditions and drug misuse including in prisoners and should include education about HI (10). Education of prison officers about HI is likely to be important in order to inform and highlight the potential for HI to increase the risk of behaviors that can become management problems and lead to negative interactions (2,6).

## Conclusions

This is the first study on psychoeducation about HI to be reported in a prison setting. It was demonstrated that a single 1-hour session can be successfully delivered in a prison environment, can improve knowledge about HI and target a relevant population whose needs are not currently met.

## Disclosure statement

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