# Psychological morbidity and return to work after injury: multicentre cohort study

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Tel: 0115 8466914

Word count: 2482

Abstract word count: 247

Key words: injuries, work, mental health, cohort study

**Abstract**

**Background:** The benefits of work for physical, psychological and financial wellbeing are well documented. Return to work (RTW) after unintentional injury is often delayed, and psychological morbidity may contribute to this delay. The impact of psychological morbidity on RTW after a wide range of unintentional injuries in the UK has not been adequately quantified.

**Aims:** To quantify the role of psychological factors including anxiety, depression and post-traumatic distress on RTW following unintentional injuries.

**Design and Setting:** Longitudinal multi-centre prospective study in Nottingham, Bristol, Leicester and Guildford, UK

**Method:** Participants (n=273) were 16-69 year olds admitted to hospital following unintentional injury and, in paid employment prior to injury. They were surveyed at baseline, 1, 2, 4 and 12 months following injury on demographic and injury characteristics, psychological morbidity and RTW status. Associations between demographic, injury and psychological factors and RTW status were quantified using random effects logistic regression.

**Results:** The odds of RTW reduced as depression scores one month post-injury increased (OR 0.87, 95%CI 0.79, 0.95) and as length of hospital stay increased (OR 0.91, 95%CI 0.86, 0.96). Those experiencing threatening life events following injury (OR 0.27, 95%CI 0.10, 0.72) and with higher scores on the crisis social support scale (OR 0.93, 95%CI 0.88, 0.99) had a lower odds of RTW. Multiple imputation analysis found similar results except crisis social support did not remain significant.

**Conclusion:** Primary care professionals can identify patients at risk of delayed RTW who may benefit from management of psychological morbidity and support to RTW.

**How this fits in**

Injuries are common in working age-adults; resulting in a delayed return to work (RTW) for many.

The benefits of work for physical, psychological and financial wellbeing are well documented.

Depression occurring early in the recovery period, threatening life events after the injury and a longer stay in hospital significantly reduce the odds of RTW in the first year after injury.

Primary care professionals can identify patients at risk of delayed RTW, detect and manage psychological morbidity and provide support to RTW.

## Introduction

Being in work benefits physical and mental health,[1] while being out of work can have financial, physical and psychological consequences.[2] The importance of identifying modifiable factors which, if addressed, may help individuals to remain in work is highlighted by The Black Report, "Working for a healthier tomorrow".[2] In England in 2014-15, 319,000 adults aged 16-69 years were admitted to hospital with traumatic injuries or poisoning (external cause codes V01-X59).[3] The annual NHS costs of care in the first 12 months after such injuries has recently been estimated at £1.53 billion.[4] Hospital treated injuries result in substantial health-related work absence; with 17% of emergency department attenders and 43% of hospital admissions not RTW 4 months post-injury.[5] Injuries also account for 10% of sick notes in the UK,[2] and 14% of benefit claimants.[6]

Depression,[7-11] anxiety[12] and post-traumatic stress disorder (PTSD)[13] are common after traumatic injury. For example, a review focussing on road traffic injuries[14] estimated prevalence at 1 year ranged from 21-67% for depression, 4-87% for anxiety and 0-100% for PTSD. These conditions impact negatively on ability to RTW.[8, 13, 15-20] This is illustrated by one study,[20] which found fewer patients with depression (52%) or PTSD (47%) were working 6 months after injury than those without depression (73%) or PTSD (78%).

As depression, anxiety and PTSD are detectable and treatable, it is important to quantify their impact on RTW amongst injured working-age adults in the UK. This paper reports findings on psychological morbidity and RTW from the Impact of Injuries Study, to inform identification and management of these diagnoses post-injury in primary care, and other services such as occupational health.

## Methods

Study methods are fully described in the published protocol.[21]

*Study design*

Multi-centre longitudinal cohort study in four NHS acute hospital trusts with emergency departments in Nottingham, Bristol, Leicester and Guildford, UK. These sites were chosen due to prior experience of recruiting to similar studies.

*Participants*

Participants were recruited from June 2010-June 2012 within three weeks of hospital admission for unintentional injury. Those aged 16-70 years with a fixed address (to enable follow-up) were eligible. Those with loss of consciousness, amnesia or a Glasgow coma scale of <15 at presentation were excluded due to difficulty distinguishing between head injury sequelae and psychological morbidity.[22] Participants were recruited face-to-face, by post and by phone. Quota sampling by injury type was used from June 2010-May 2011, but subsequently due to slow recruitment, all eligible patients could participate. Only participants in paid employment at the time of injury were included in this paper's analyses.

*Data collection*

Participants completed self-administered questionnaires at recruitment (baseline) and at 1, 2, 4 and 12 months post-injury. Baseline questionnaires assessed socio-demographic characteristics (age, marital status, ethnicity, number of cars in household, living alone, employment status, area-level deprivation (Index of Multiple Deprivation (IMD) 2010);[23] injury details, long term health conditions, anxiety and depression [24] alcohol problems,[25] substance use,[26] and social functioning.[27] Injury severity was assessed from medical records using the Abbreviated Injury Scale (AIS)[28] grouped into: minor (AIS=1), moderate (AIS=2) and serious to maximum (AIS=3-6) and based on the most severe injury for participants with multiple injuries. Follow-up questionnaires included questions on time off work since injury, self-reported recovery,[29] post-traumatic distress,[30] threatening life events related to the

injury,[31] social support,[32] positive and negative changes in outlook[33] and legal proceedings or compensation claims due to injury. More information about each scale can be found in table 1. Researchers administered structured clinical interviews (SCID)[34] measuring psychological morbidity for all participants at baseline.
[INSERT TABLE 1]

*Outcomes*

The primary outcome was whether a participant reported RTW. This was a binary outcome at each time point (1, 2, 4 and 12 months post-injury). RTW was defined as being in full or part-time paid employment, working at the specific time point and not prevented from working because of their injury since the previous follow-up time point.

The sample for this analysis comprised participants in paid employment at baseline, who returned the 1 month questionnaire, and at least one subsequent follow-up questionnaire (at 2, 4 or 12 months).

*Statistical Analysis*

Baseline characteristics were described and compared between the sample described above (responders) and those employed at baseline who returned the 1 month questionnaire but did not return any subsequent follow-up questionnaires (non-responders). Categorical data were compared using chi-square tests, and continuous data using t-tests or Mann-Whitney U tests dependent on distributions.
Proportions of participants who had RTW were calculated and a RTW trajectory was developed.[35] Non-responders and those with missing RTW data were categorised as 'unknown'.

Univariate and multivariable odds ratios with 95% confidence intervals were estimated for RTW using random effects logistic regression to account for repeated measures of RTW at 2, 4 and 12 months. Linearity of continuous predictors was assessed, and non-

linear predictors were categorised into quintiles. Models were built using predictors described in box 1.

[INSERT BOX 1]

Block 2 psychological predictors at 1 month were added in order of statistical significance on univariate analysis, to Block 1 and retained if the likelihood ratio test (LRT) p-value was <0.05. Correlations between predictors in Blocks 3 and 4 with Block 2 psychological predictors were assessed. Those with correlation coefficients ≥0.5 or ≤-0.5 were excluded from the analysis. Block 3 predictors were added and retained in the model if the LRT $p<0.05$ or if their removal resulted in a >10% change in the 1 month psychological predictor odds ratio. Block 4 predictors were added and retained as for Block 3. Interactions between psychological predictors at 1 month and age, sex, and follow-up time were assessed based on LRT $p<0.01$. Collinearity was assessed by the covariance correlation matrix and variance inflation factors. Model assumptions were checked using deviance residuals. Multiple imputation with chained equations was used to impute missing data for all participants employed at baseline. The imputation model included all predictors in the univariate analysis and the outcome (RTW at 2, 4, and 12 months). Ten datasets were created and combined using Rubin's rules.[36, 37]

**Results**

Three fifths (393, 59%) of the total 668 study participants were employed at the time of injury. Of these 299 (76%) returned the 1 month follow-up questionnaire; and 273 (91%) returned at least one subsequent follow-up questionnaire and so formed the sample for these analyses. Figure 1 shows the flow of participants in the study.

[INSERT FIGURE 1]

Table 2 shows baseline characteristics of the study sample: 52% were men, ages ranged from 16-69 years and 53% were aged 45 to 64; 66% had an injury of moderate severity; 43% reported single injuries; 62% had an injury of the lower limb; injuries most commonly occurred at work (30%), and were most frequently caused by falls (58%).

[INSERT TABLE 2]

Few (13%) participants returning follow-up questionnaires had RTW at 1 month, 23% had RTW at 2 months, 52% at 4 months, and two thirds at 12 months (67%). Only 6% of participants had fully RTW at all time points; 4% initially RTW, but had not RTW at a later time point; over 50% had a delayed RTW; 8% had not RTW at any time point and 29% had insufficient information to categorise RTW over the full 12 month period.

Univariate and multivariable associations with RTW are shown in tables 3 and 4 respectively. In the final model, a one unit increase in the HADS depression score reduced the odds of RTW by 13% (OR 0.87, 95% CI: 0.79, 0.95), a one unit increase in the number of nights in hospital reduced the odds of RTW by 9% (OR 0.91, 95% CI: 0.86, 0.96), the odds of RTW reduced by 7% per unit increase in crisis support (OR 0.93, 95% CI: 0.88, 0.99); and by 73% for those experiencing threatening life events since the injury (OR 0.27, 95% CI: 0.10, 0.72). Social functioning and negative changes in outlook were excluded due to high correlations with the HADS-D at 1 month. No significant interactions between depression at 1 month and age, sex, and time were found. Variance inflation factors ranged from 1.03 to 3.08.

[INSERT TABLES 3 and 4]

Non-responders were significantly younger ($p<0.001$), significantly more likely to be male ($p<0.001$), single ($p<0.001$), live in disadvantaged areas ($p<0.001$), and have

scores indicating greater problems with alcohol (P=0.001) and drug use (p=0.01). Results from the multiple imputation analysis (table 3) were similar to the complete case analysis. Associations between depression at 1 month (OR 0.91, 95%CI 0.85, 0.99), nights in hospital (OR 0.92, 95%CI 0.88, 0.97) and threatening life events (OR 0.42, 95%CI 0.19, 0.92) remained significant. Crisis support no longer remained significantly associated with RTW (OR 0.97, 95%CI 0.92, 1.03).

## Discussion

*Main findings*

One third of participants had not returned to work at 12 months post-injury. A higher depression score at one month post-injury, longer hospital stay, subsequent threatening life events and higher crisis support were associated with significantly lower odds of RTW after injury. Other socio-demographic and injury characteristics were not independently associated with RTW status. Findings for depression, length of stay and threatening life events remained significant in multiple imputation analyses.

*Strengths and limitations*

The strengths of our study are that it is the first prospective multicentre UK study to quantify the impact of early psychological morbidity on RTW in adults aged 16-69 years admitted to hospital following a wide range of injuries. Our study addressed some limitations of previous studies by including a general injury population with injuries of varying levels of severity, measuring a series of psychological predictors of RTW, and adjusting for many potential confounders. Despite responders differing from non-responders on a range of characteristics, multiple imputation analyses showed most of our findings were robust to missing data. Follow-up rates were higher than, or comparable to studies using similar recruitment methods.[38-42]

The limitations of our study include potential selection bias as thirty percent of eligible patients approached took part and participants and non-participants may have differed

in likelihood of RTW. We were unable to explore the impact of injuries on changes in jobs and in hours of work; and further work is required to address this. The number of participants with some types of injuries was small, limiting analyses to broad injury groupings (upper limb, lower limb, upper and lower limbs, and other injuries; chosen because limb injuries are a major cause of work disability[43-45] and consistent with a systematic review of prognostic factors associated with RTW post-injury).[46] Similarly, small numbers required broad grouping of injury mechanisms. Our study sites came from the midlands and southern England. Occupations vary across the country and "blue-collar work" has previously been associated with lower rates of RTW post injury;[46] hence some care should be taken in generalising our findings to the north of the country. Black and minority ethnic groups were under-represented, potentially limiting generalisability of our findings. Work injuries are likely to have poorer work-related outcomes than those occurring elsewhere.[42, 47, 48] This may be partly explained by depression and PTSD which may be more common after occupational injuries.[8, 49-51] Small numbers of work-related injuries in our study precluded analysis of occupational injury outcomes and their predictors.

The finding of a lower odds of RTW with increasing crisis support was unexpected. The scale we used measured support provided in a crisis, not longer-term social support. Higher levels of crisis support may reflect greater emotional distress or physical impairment, which could both reduce the odds of RTW. Also the short-term nature of crisis support may not provide the buffering effect on depression often seen with longer term social support.

*Comparison with other studies*

Non-UK studies show post-injury depression and PTSD are associated with delayed RTW[19, 52, 53] but differences in occupations, benefits and compensation systems limit comparability with the UK. A 2010 systematic review of RTW prognostic factors after acute orthopaedic trauma[46] included only 2 small UK studies and we have not found

more recent UK studies. The first cohort study from 2002,[42] recruited 154 injured male hospital admissions and found greater PTSD symptoms were associated with a reduced odds of RTW 18 months post-injury (regression coefficient IES-R avoidance subscale 0.47, 95%CI not reported, $p<0.001$). The second study from 1992, a review of records of 101 road traffic injury patients receiving compensation[54] found undefined psychological problems (regression coefficient 3.24, standard error (SE) 1.54) and older age (regression coefficient -0.77, SE 0.39) were associated with a reduced likelihood of RTW. We found no association between PTSD symptoms and RTW, once depression was in the multivariable model. This may be explained by depression and PTSD often co-existing.[55] Most (81%) of our participants with moderate or severe PTSD met borderline or case criteria for depression and/or anxiety. In addition, injuries due to assaults[42] and road traffic injuries[54] were more frequent in these studies than in ours, and PTSD may be more common after such injuries. Differences in study populations may explain variation in findings for gender[42] and age[54] and our larger sample size may explain our significant finding for length of hospital stay.

*Implications for practice and research*

Patients consult frequently in primary care after injury[56] hence a range of primary care professionals, including GPs, are well placed to identify psychological morbidity post injury. Most injured patients have not RTW one month after injury and would be eligible for the Fit For Work service.[57] This provides occupational health assessments and develops a RTW Plan with patients and our findings suggest assessments should include identifying and responding to psychological morbidity. We found a small number of key factors (depression, longer inpatient stays, threatening life events subsequent to injury and greater crisis support) predicted longer work absence. GPs, occupational health services and the Fit For Work service can use these factors to identify those who may benefit from additional help to RTW.

Some GPs may regard depressive symptoms almost as "normal" after an injury and are reluctant to "medicalise unhappiness".[58] Watchful waiting may be appropriate for short-lived symptoms, but our study clearly shows the negative impact of depressive symptoms lasting one month or more post-injury. The National Institute for Health and Care Excellence (NICE) guideline on recognising and managing depression in adults with chronic physical health problems highlights the high risk of depression, where there is functional impairment.[59] Traumatic injuries requiring hospital admission frequently result in functional impairments for many months;[41, 60] hence these NICE guidelines should be applied. However traumatic injuries present additional challenges for GPs in managing depression, such as impaired mobility limiting access to group-based peer support, talking therapies or to undertaking physical activity, whilst analgesics and adjuvant pain medications may interact with antidepressants.

Further work exploring GPs' perceptions of psychological problems post-injury, the extent and ways in which they identify, manage and coordinate care for these patients and barriers and facilitators to doing so would be useful. Longitudinal studies assessing the impact of psychological problems on RTW after acute traumatic occupational injuries would also be useful, because this group may be at particular risk of psychological problems.

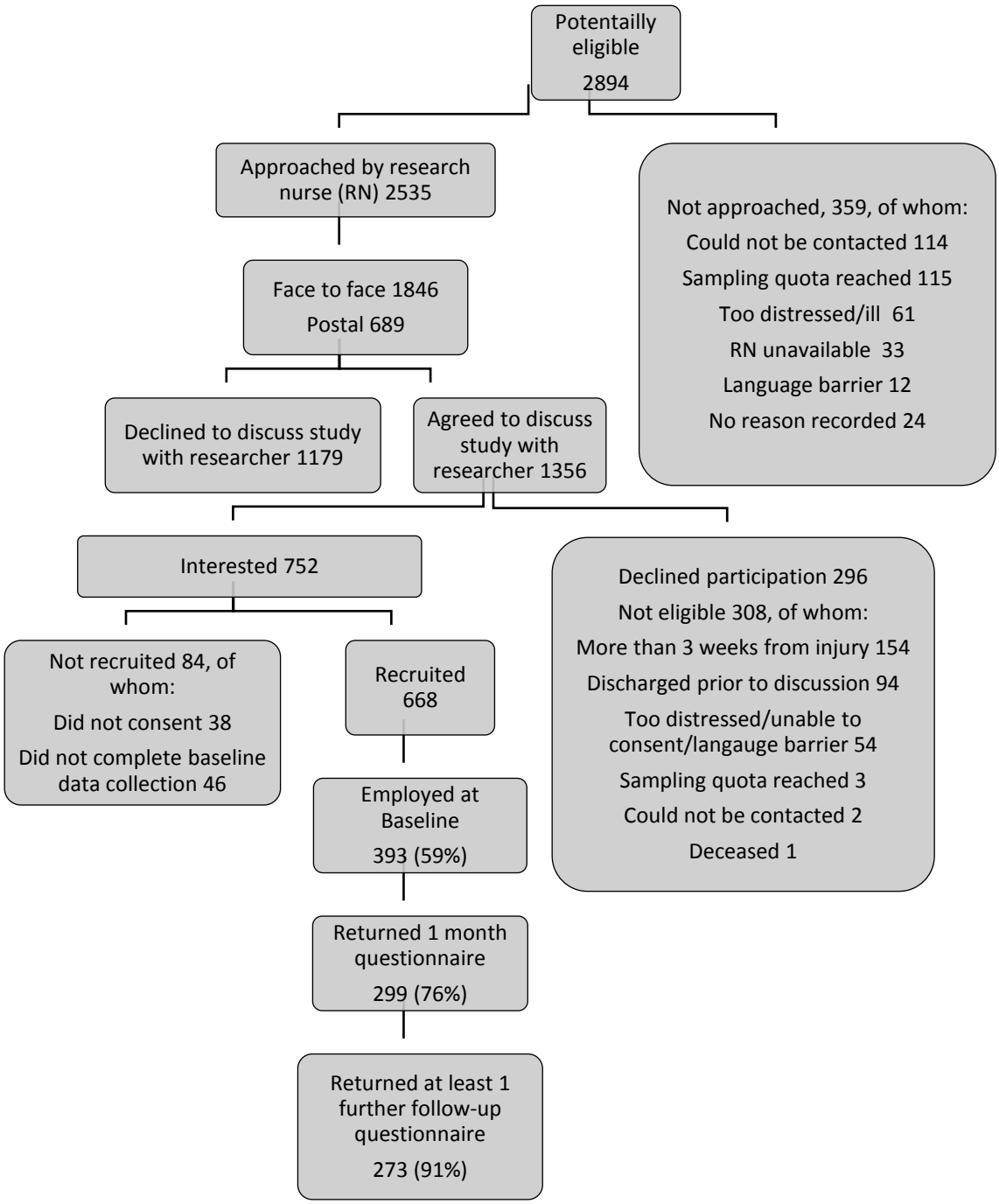
**Funding:**

This study was funded by the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care (CLAHRC) Nottinghamshire Derbyshire and Lincolnshire. RM is currently funded by NIHR CLAHRC East Midlands. The views expressed are those of the authors and not necessarily of the National Health Service, NIHR or the Department of Health.

**Ethical approval**: for the study was provided by Nottingham Research Ethics Committee 1 (number: 09/H0407/29).

**Competing interests**: None

Figure 1. Flow chart to show the flow of participants in the study, and those eligible for the analysis.



Box 1: Predictors and potential predictors of RTW included in the multivariable model building

Block 1 (a-priori predictors): age, sex, study centre, and time.

Block 2 (psychological predictors at 1 month): HADS depression (HADS-D), HADS anxiety (HADS-A), IES avoidance (IES-A), IES intrusion (IES-I), AUDIT and DAST.

Block 3 (potential predictors at baseline): number of psychological morbidities, HADS-D, HADS-A, AUDIT, DAST, long standing illness, work status, ethnicity, deprivation, marital status, length of hospital stay, injury characteristics (severity, number, body part, mechanism and location).

Block 4 (potential predictors at 1 month): social functioning, social support, changes in outlook (positive and negative), threatening life events since injury, pain visual analogue scale, compensation, and litigation.

Table 1: Description and reliability scores for scales used

| **Variables** | **Scale used** | **Description of scale** | **Cronbach's alpha** |
|---|---|---|---|
| Anxiety and Depression | Hospital Anxiety and Depression Scale (HADS) | Measure consists of 7 items measuring depression and 7 items measuring anxiety. Scores range from 0 to 21 for each subscale. Higher scores indicate higher severity of anxiety and depression. | .80 (anxiety)<br>.70 (depression)<br>.83 (overall) |
| Alcohol problems | Alcohol Use Disorder Identification Test (AUDIT) | Measure consists of 10 items measuring alcohol problems. Scores range from 0 to 40. Higher scores indicate higher levels of excessive or harmful drinking. | .79 |
| Substance use | Drug Abuse Screening Test (DAST) | Measure consists of 10 items measuring drug use. Scores range from 0-10. Higher scores indicate higher levels of abuse of substances other than alcohol. | .67 |
| Social functioning | Social Functioning Questionnaire (SFQ) | Measure consists of 8 items measuring social functioning. Score ranging from 0 to 24. Higher scores indicate greater social dysfunction | .72 |
| Post-traumatic distress | Impact of Events Scale (IES) | Measure consists of 7 items measuring intrusion and 8 measuring avoidance symptoms. Scores range from 0 to 75 overall. Higher scores indicate higher severity of post-traumatic symptoms. | .89 (intrusion)<br>.84 (avoidance)<br>.92 (overall) |
| Social support | Crisis Support Scale (CSS) | Measure consists of 6 items measuring social support. Scores range from 6-42. Higher scores indicate higher social support. | .76 |
| Positive and negative changes in outlook | Change in Outlook Questionnaire, (CiOQ) | Measure consists of 5 items measuring positive changes and 5 items measuring negative changes. Scores range from 5 to 30 for each subscale. Higher scores indicate respective greater positive and negative changes. | .78 (negative)<br>.87 (positive) |

Table 2. Baseline characteristics of study participants.

| Characteristics measured at baseline | Participants employed at baseline, returned 1 month questionnaire and at least 1 follow-up questionnaire (n=273) |
|---|---|
| Centre | |
| Nottingham | 99 (36.3) |
| Loughborough | 74 (27.1) |
| Bristol | 71 (26.0) |
| Surrey | 29 (10.6) |
| Age | |
| 16-24 | 29 (10.6) |
| 25-44 | 92 (33.7) |
| 45-64 | 145 (53.1) |
| 65-69 | 7 (2.6) |
| Sex | |
| Female | 132 (48.4) |
| Male | 141 (51.7) |
| Number of psychiatric diagnoses in past (obtained from the SCID) | |
| 0 | 237 (86.8) |
| 1 | 27 (9.9) |
| ≥2 | 9 (3.3) |
| HADS-D | [1] |
| Median (IQR) | 0 (0, 2) |
| HADS-A | [1] |
| Median (IQR) | 2 (0, 4) |
| AUDIT scale | [5] |
| Median (IQR) | 4 (2, 6) |
| DAST scale | [2] |
| Median (IQR) | 0 (0, 0) |
| Social functioning scale | |
| Median (IQR) | 1 (0, 3) |
| Pain visual analogue scale | [1] |
| Median (IQR) | 0 (0, 2) |
| Long standing illness | [1] |
| No | 230 (84.3) |
| Yes | 42 (15.4) |
| Ethnic group | |
| White | 265 (97.1) |
| Black or ethnic minority | 8 (2.9) |
| Deprivation (IMD) | [3] |
| Median (IQR) | 12 (7, 20) |
| Marital status | |
| Single | 74 (27.1) |
| Married/partnership | 164 (60.1) |
| Divorced/widowed | 35 (12.8) |

| | |
|---|---|
| Nights in hospital | [11] |
| Median (IQR) | 5.5 (3, 8) |
| Injury severity* | [1] |
| Minor | 15 (5.5) |
| Moderate | 206 (75.5) |
| Serious or worse | 51 (18.7) |
| Number of injuries | |
| 1 | 117 (42.9) |
| 2 | 91 (33.3) |
| ≥3 | 65 (23.8) |
| Body part injured | |
| Other | 28 (10.3) |
| Upper limb | 49 (18.0) |
| Lower limb | 170 (62.3) |
| Upper and lower limbs | 26 (9.5) |
| Injury mechanism | |
| Other | 28 (10.3) |
| Falls | 159 (58.2) |
| Traffic | 63 (23.1) |
| Struck | 23 (8.4) |
| Place of injury | [1] |
| Other | 42 (15.4) |
| Home | 39 (14.3) |
| Work | 83 (30.4) |
| Road | 29 (10.6) |
| Countryside | 38 (13.9) |
| Sports facilities | 41 (15) |

[ ] missing values. SCID= structured clinical interview; HADS-D=HADS depression; HADS-A= HADS anxiety; AUDIT=alcohol use disorder identification test; DAST=drug abuse screening test; IMD = Index of Multiple Deprivation. *Injury severity measured using the Abbreviated Injury Scale (AIS); minor = AIS=1, Moderate = AIS=2, Serious or worse = AIS> =3.

Table 3. Unadjusted odds ratios for potential factors associated with RTW (with 95% confidence intervals).

| **Variables** | **Unadjusted OR (95% CI)** |
|---|---|
| **A-priori confounders** | |
| Centre | |
| Nottingham | 1.00 |
| Loughborough | 0.82 (0.51, 1.31) |
| Bristol | 0.92 (0.57, 1.48) |
| Surrey | 1.96 (1.00, 3.84) |
| Age | |
| 16-24 | 1.00 |
| 25-44 | 1.29 (0.67, 2.51) |
| 45-64 | 0.95 (0.51, 1.76) |
| 65-69 | 0.65 (0.19, 2.28) |
| Sex | |
| Female | 1.00 |
| Male | 1.04 (0.71, 1.51) |
| Follow-up Time | |
| 2 months | 1.00 |
| 4 months | 11.72 (6.06, 22.70) |
| 12 months | 77.39 (30.91, 193.77) |
| **Psychological predictors at 1 month post-injury** | |
| HADS-D | 0.92 (0.88, 0.96) |
| HADS-A | 0.92 (0.88, 0.97) |
| IES-A | 0.96 (0.93, 0.98) |
| IES-I | 0.96 (0.94, 0.99) |
| AUDIT scale | |
| 1 (0) | 1.00 |
| 2 (1-2) | 1.08 (0.64, 1.83) |
| 3 (2.2-3) | 1.73 (0.95, 3.16) |
| 4 (3.3-6) | 2.12 (1.19, 3.76) |
| 5 (7-25) | 1.16 (0.65, 2.05) |
| DAST scale | 1.08 (0.69, 1.67) |
| **Psychological, social-demographic, and injury characteristics at baseline** | |

| | |
|---|---|
| Number of psychiatric diagnoses in past (SCID) | |
| 0 | 1.00 |
| 1 | 0.88 (0.46, 1.68) |
| ≥2 | 0.27 (0.09, 0.80) |
| HADS-D | 0.94 (0.85, 1.04) |
| HADS-A | 0.99 (0.93, 1.05) |
| AUDIT scale | 1.00 (0.96, 1.04) |
| DAST scale | 0.92 (0.61, 1.37) |
| Long standing illness | |
| No | 1.00 |
| Yes | 0.76 (0.46, 1.27) |
| Ethnic group | |
| White | 1.00 |
| Black or minority ethnic group | 0.43 (0.12, 1.48) |
| Deprivation (IMD) | 0.98 (0.97, 1.00) |
| Marital status | |
| Single | 1.00 |
| Married/partnership | 1.43 (0.92, 2.22) |
| Divorced/widowed | 1.17 (0.62, 2.20) |
| Nights in hospital | 0.93 (0.90, 0.97) |
| Injury severity* | |
| Minor | 1.00 |
| Moderate | 0.73 (0.32, 1.63) |
| Serious or worse | 0.42 (0.17, 1.02) |
| Number of injuries | |
| 1 | 1.00 |
| 2 | 1.12 (0.73, 1.72) |
| ≥3 | 0.60 (0.38, 0.97) |
| Body part injured | |
| Other | 1.00 |
| Upper limb | 0.95 (0.46, 1.96) |
| Lower limb | 0.55 (0.29, 1.04) |
| Upper and lower limbs | 0.45 (0.19, 1.03) |
| Injury mechanism | |
| Other | 1.00 |
| Falls | 1.00 (0.54, 1.84) |
| Traffic | 0.75 (0.38, 1.49) |

| | |
|---|---|
| Struck | 1.10 (0.47, 2.57) |
| Place of injury | |
| Other | 1.00 |
| Home | 0.63 (0.32, 1.22) |
| Work | 0.70 (0.40, 1.24) |
| Road | 0.90 (0.44, 1.85) |
| Countryside | 1.28 (0.64, 2.55) |
| Sports facilities | 0.61 (0.31, 1.17) |
| **Other predictors at 1 month post-injury** | |
| Social functioning scale (Quintiles) | |
| 1 (0-4.6) | 1.00 |
| 2 (5-6.9) | 0.42 (0.24, 0.73) |
| 3 (7-8) | 0.31 (0.18, 0.54) |
| 4 (9-10) | 0.29 (0.16, 0.52) |
| 5 (10.3-18.3) | 0.23 (0.13, 0.42) |
| CCS scale | 1.00 (0.97, 1.04) |
| CiOQ-P scale | 0.96 (0.94, 0.98) |
| CiOQ-N scale | 0.97 (0.93, 1.01) |
| Threatening life events since injury | |
| No | 1.00 |
| Yes | 0.38 (0.22, 0.66) |
| Pain visual analogue scale | 0.98 (0.98, 0.99) |
| Seeking compensation | |
| No | 1.00 |
| Yes | 0.59 (0.38, 0.90) |
| Involved in litigation | |
| No | 1.00 |
| Yes | 0.57 (0.35, 0.94) |

SCID= structured clinical interview; HADS-D=HADS depression; HADS-A=HADS anxiety; IES-A=IES avoidance; IES-I=IES intrusion; AUDIT=alcohol use disorder identification test; DAST=drug abuse screening test; IMD = Index of Multiple Deprivation; CSS=Crisis Support Scale; CiOQ-P=Change in outlook questionnaire (positive); CiOQ-P=Change in outlook questionnaire (negative). *Injury severity measured using the Abbreviated Injury Scale (AIS); minor = AIS=1, Moderate = AIS=2, Serious or worse = AIS>3

Table 4. Adjusted odds ratios for psychological predictors at 1 month post-injury associated with RTW in complete case and multiple imputation analysis.

| **Characteristics** | **Final model (complete case analysis)** | **Final model (multiple imputation analysis)** |
|---|---|---|
| | **Odds Ratio (95% CI)** | **Odds Ratio (95% CI)** |
| **A-priori confounders** | | |
| Centre | | |
| Nottingham | 1.00 | 1.00 |
| Loughborough | 0.86 (0.40, 1.85) | 0.90 (0.48, 1.71) |
| Bristol | 0.68 (0.31, 1.48) | 0.95 (0.52, 1.73) |
| Surrey | 2.62 (0.92, 7.50) | 1.97 (0.81, 4.80) |
| Age | | |
| 16-24 | 1.00 | 1.00 |
| 25-44 | 1.13 (0.39, 3.29) | 0.95 (0.44, 2.08) |
| 45-64 | 0.44 (0.16, 1.24) | 0.60 (0.27, 1.31) |
| 65-69 | 0.27 (0.04, 1.99) | 0.31 (0.06, 1.68) |
| Sex | | |
| Female | 1.00 | 1.00 |
| Male | 0.73 (0.39, 1.34) | 0.79 (0.45, 1.38) |
| Time | | |
| 2 months | 1.00 | 1.00 |
| 4 months | 10.80 (5.62, 20.76) | 7.16 (3.61, 14.19) |
| 12 months | 72.17 (29.02, 179.45) | 31.78 (13.87, 72.81) |
| **Psychological predictors at 1 month post-injury** | | |
| HADS-D | 0.87 (0.79, 0.95) | 0.91 (0.85, 0.99) |
| **Psychological, socio-demographic, and injury characteristics at baseline** | | |
| Nights in hospital | 0.91 (0.86, 0.96) | 0.92 (0.88, 0.97) |
| **Other predictors at 1 month post-injury** | | |
| CSS scale | 0.93 (0.88, 0.99) | 0.97 (0.92, 1.03) |
| Threatening life events since injury | | |
| No | 1.00 | 1.00 |
| Yes | 0.27 (0.10, 0.72) | 0.42 (0.19, 0.92) |

HADS-D=HADS depression; CSS=Crisis Social Support.

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