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ORIGINAL REPORT

DETERMINANTS OF RETURN TO WORK FOLLOWING NON-LIFE-THREATENING ACUTE ORTHOPAEDIC TRAUMA: A PROSPECTIVE COHORT STUDY

Fiona J. Clay, MSc[1], Stuart V. Newstead, PhD[1], Wendy L. Watson, PhD[2] and Roderick J. McClure, PhD[1]

From the [1]Monash University, Accident Research Centre, Clayton, Victoria, and [2]NSW Injury Risk Management Research Centre, University of NSW, Sydney, Australia

Objective: **To determine factors associated with return to work following acute non-life-threatening orthopaedic trauma.**
Design: **Prospective cohort study.**
Participants: **One hundred and sixty-eight participants were recruited and followed for 6 months. The study achieved 89% participant follow-up.**
Methods: **Baseline data were obtained by survey and medical record review. Participants were further surveyed at 2 weeks, 3 and 6 months post-injury. Logistic regression was used to examine the association between potential predictors and first return to work by these 3 time-points.**
Results: **Sixty-eight percent of participants returned to work within 6 months. Those who sustained isolated upper extremity injuries were more likely to return to work early. Significant positive determinants of return to work included a strong belief in recovery, the presence of an isolated injury, education to university level and self-employment. Determinants associated with non-return to work included the receipt of compensation, older age, pain attitudes and blue-collar work. The primary reason given for return to work was financial security.**
Conclusion: **Demographic, injury, occupation and psychosocial factors were significant predictors of return to work. The relative importance of factors at different time-points suggests that return to work is a multifactorial process that involves the complex interaction of many factors in a time-dependent manner.**

Key words: orthopaedic; Injury Severity Score; return to work; bio-psychosocial; outcome; acute trauma; injury.

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Correspondence address: Fiona J. Clay, Monash University, Accident Research Centre Building 70, Clayton, Victoria, 3800, Australia, E-mail: fiona.clay@muarc.monash.edu.au

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INTRODUCTION

Over many years, research has been directed towards understanding the determinants of return to work (RTW) following injury. In part, this has been in response to the increasing financial and social burden associated with work-related musculoskeletal injuries (1), and in part it is a recognition stemming from empirical studies that document the value of work in terms of self-esteem, community connectedness, financial reward and overall health (2). RTW is an identified outcome of occupational rehabilitation and is considered a marker of the effectiveness of compensation systems (3).

Much of the focus of research to date has been on RTW following cumulative trauma associated with neck and back injuries (4). There is a relative lack of research directed to understanding determinants of RTW following acute orthopaedic trauma. Although a number of studies have considered RTW in the context of multiple injury (5), major trauma (6, 7) or in relation to specific acute injuries (8, 9), there have been few studies that have considered determinants of RTW following a range of minor or moderate acute non-life-threatening orthopaedic trauma. This may be due to the common belief that the appropriate focus of research should be on major trauma and that minor injury is of little real consequence as it resolves by itself. However, minor and moderate injuries comprise the majority of traumatic injuries and contribute significantly to the burden of injury. In one study, they were shown to account for up to 80% of the short-term and 75% of the lifetime morbidity (10).

While the focus of many studies of RTW following acute orthopaedic trauma has been on determinants related to specific aspects of the injury, including types of treatment and rehabilitation; a number of determinants, including age, education, income, gender, type of work, depression, post-traumatic stress, compensation status and self-efficacy, have been reported in the literature as factors that predict RTW (9, 11–12).

RTW rates between 15% and 75% during the first year following injury (9, 12–14) have been documented, but interpretation of these rates is complicated by different follow-up periods, different definitions of RTW, samples that include participants not employed at the time of the injury (15) and generic outcomes where RTW is grouped together with return to education or home duties (5, 16). While studies have employed multivariate analysis to determine factors associated with RTW, few studies have asked participants for the reason(s) that they returned or did not return (9, 17).

The aim of this study is to establish determinants of RTW following non-life-threatening orthopaedic injuries. This study is grounded theoretically in a bio-psychosocial approach that conceptualizes work disability as reflecting an interaction between medical/biological factors as well as psychosocial,

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environmental and ergonomic factors (18). Specifically, we wished to establish what individual factors are associated with RTW and whether the importance of predictive factors changes with time following the injury. Finally, we sought to establish the reasons reported by participants for returning to work.

METHODS

Study design and setting

This study is a multi-centre prospective follow-up cohort study conducted in the state of Victoria, Australia.

Patients and procedures

Patients presenting to 1 of 4 hospitals in Victoria, Australia, as a result of sustaining acute orthopaedic trauma were recruited to the project. Study hospitals were chosen to achieve a representative sample of all people of working age admitted to Victorian public hospitals as a consequence of sustaining acute unintentional trauma, following an analysis of the Victorian Admitted Episodes Dataset (19).

The inclusion criteria were: people aged 18–64 years who were employed for a wage during the 4 weeks prior to the injury, with English language skills sufficient to allow completion of questionnaires. Patients were excluded if they had sustained an intentional injury, were not employed, or if medical staff considered them to be medically unfit to provide informed consent. Patients with a significant traumatic brain injury associated with prolonged loss of consciousness were excluded because of the documented cognitive sequelae that are not comparable to other types of injury. The majority of participants were recruited following admission to hospital as a result of their injury; 10% of participants were recruited following treatment and discharge from the emergency department.

Injury factors were retrieved from the patient's medical record in order to allow for the coding of the injury according to the Abbreviated Injury Severity (AIS) Scale and the subsequent calculation of the Injury Severity Score (ISS) (20, 21). Patients were classed as having a minor injury if they had an ISS of 1–8, moderate injury ISS 9–15 and a major injury ISS > 15. The AIS Scale was also used to create categories of orthopaedic injuries according to the site of injury. A retrospective assessment of pre-injury health was conducted at recruitment and patients were further surveyed by telephone or in person if they were still in hospital, at 2 weeks, 12 weeks and 6 months following their injury. The follow-up time-points were chosen based on the different phases of disability (acute, sub-acute and chronic) following injury (22). All patients were recruited and followed between March 2005 and October 2006.

Study factors

Study factors used in the analysis were chosen with respect to the hypothesis being tested, and reflected findings from the literature as well as discussions with key informants. The possible predictors of outcome were grouped as follows: (*i*) Demographic factors: Age and gender; (*ii*) Pre-injury health: History of prior pain and co-morbidities at study entry; (*iii*) Injury factors: ISS, isolated vs multiple injuries and initial need for surgery; (*iv*) Occupation factors: Full-time or part-time work, being injured at work, blue-collar work and self-employment; (*v*) Psychosocial factors: Education level, compensation status, pain levels post-injury, pain attitudes, recovery beliefs and psychological distress.

Gender, work category and initial pain levels were considered as potential confounders.

At recruitment, participants were asked whether they had experienced any difficulties with pain prior to the injury. Pain intensity was measured at the first follow-up using the short-form McGill Pain Questionnaire, a validated dedicated pain measurement tool. Participants were asked to rate their overall pain since the injury using a 6-item adjectival scale (23). The scale is scored: 1 = no pain, 2 = mild, 3 = discomforting, 4 = distressing, 5 = horrible, and 6 = excruciating. Responses were dichotomized into the following groups (mild: 1–3 vs high 4–6).

Compensable status was measured by asking participants if they were receiving medical treatment or wage compensation for their injury from state-based compensation authorities responsible for work- and transport-related injury. Self-employed workers are not covered for work injury (24). Recovery beliefs were assessed by asking participants at 2 weeks post-injury to rate on a scale from 0 to 10 if they believed they would recover enough to return to their usual pre-injury activities (25). High scores represented a strong belief in recovery. The scores were skewed in the direction of high scores. The variable was dichotomized such that scores from 8 to 10 reflected strong recovery beliefs and scores from 0 to 7 low to medium recovery beliefs.

A single question on pain as it relates to work was adapted from the Survey of Pain Attitudes (SOPA) (26–27). The SOPA is a validated instrument that assesses the impact of patient's feelings about pain control, solicitude, medication, disability, emotion, medical cure and harm. Participants were asked at the first follow-up if they agreed or disagreed with the statement that they should not work with their current level of pain. Possible responses were: 1 = strongly agree; 2 = moderately agree; 3 = slightly agree; 4 = slightly disagree; 5 = moderately disagree; and 6 = strongly disagree. Responses were dichotomized: agree (1–3) vs disagree (4–6).

Co-morbid health conditions were obtained from the medical records. Age was assessed for the effect of each year as a continuous variable. Participant self-reported general health was measured using a single item (Question 1) from the 36-item Short-Form Health Survey (SF36) and symptoms of anxiety, depression and stress were assessed using the Depression Anxiety Stress Scale (DASS-21). These measures were collected retrospectively to establish pre-injury baselines and prospectively at 2 weeks post-injury. The SF36 is a validated generic questionnaire that examines health-related functioning and well-being from the patient's viewpoint (28). Participants were asked to consider their general health since the injury and to rate whether they thought their health was excellent, very good, good, fair or poor. Responses were dichotomized as Good: excellent/very good versus Poor: good/fair/poor pre-injury general health. The DASS is a generic measure comprising 3 self-report scales (29). The scales were scored and categorized according to recommended cut-offs (normal, mild, moderate, severe, extremely severe) (30). A composite variable (normal vs psychological distress) was created, in which participants who reported symptoms of depression, anxiety or stress regardless of severity at 2 weeks post-injury were grouped together and participants whose responses were categorized as normal were grouped together.

At each follow-up, participants were asked if they had received rehabilitation following discharge from the hospital and if this was as a hospital inpatient, hospital outpatient or in the community. Variables with multiple categories were dichotomized to give sufficiently large cell counts for adequate statistical power in multivariate analyses. Dichotomous categories defined for each factor were: educational status (completed university vs less than university); injury severity (ISS < 9 vs ISS ≥ 9) and co-morbid conditions (none vs 1 or more).

Assessment of return to work outcomes

In the current study, the analysis of determinants of RTW focused on first RTW regardless of whether the participant returned to work with a new employer or returned to modified work. At each follow-up, participants were asked whether they had returned to work since the last interview. Participants who had returned to work were asked if they had returned to the same employer. Finally, participants were asked their reasons for returning to work. A range of options was provided; participants could choose more than one option or provide alternative responses.

Statistical analysis

The SPSS 15.0 program (SPSS Release 15.0, Chicago, USA) was used for all data analysis. Descriptive data are presented as means (standard deviations) or number of subjects (percentages). The unadjusted univariate association between explanatory factors and RTW outcomes was calculated using χ^2 tests for categorical variables and *t*-tests for continuous variables. The continuity correction was applied for factors involving 2 × 2 categories. The baseline characteristics of patients with complete data at 6 months were compared with participants with incomplete follow-up, using χ^2 tests or *t*-tests.

Study variables showing near significant ($p < 0.25$) univariate associations with RTW were entered as independent variables into all multivariate analyses. Study variables with less significant associations, but which were considered conceptually important and/or possibly subject to a significant confounding effect, were also entered into the multivariate analysis.

Binary logistic regression was used to identify independent predictors of RTW at 2 weeks, 12 weeks and 6 months post-injury. Correlations between factors that may indicate collinearity were assessed *pre hoc* using Spearman and Kendall correlations. Correlation coefficients were calculated for all independent variables considered for the model. If a correlation > 0.50 was found between a pair of determinants, one factor was removed from the analysis. All factors of interest were included simultaneously in the model. Potential confounders were then included one at a time in the model.

A confounding factor was retained in the model if it was a statistically significant predictor of the outcome and the odds ratios (ORs) of other factors changed by > 10%. If the potential confounder was not significant but the ORs were changed by > 10%, the 2 models were compared and a decision was made on whether to retain the variable in the final model. The decision was based on whether or not the confounder changed the overall conclusions for the final model. Interactions between study factors were tested in the model one at a time and retained if they significantly improved the log-likelihood of the model with a significance of $p < 0.05$.

The Hosmer & Lemeshow (31) test was used to assess the goodness of fit. The presence of outliers was assessed using Leverage and Cook's distance. Potentially influential outliers were removed one at a time and the model re-run to assess the impact of the outlier on the model. If an outlier improved the overall classification of the final model by > 5% and was shown not to be a result of an error, the outlier was removed from the final model. A probability (*p*) value of < 0.05 was considered significant. Nagelkerke pseudo R-squared values are reported.

Ethics

Ethics approval was obtained from the Standing Committee on Ethics in Research Involving Humans of Monash University and the corresponding ethics committees at all participating hospitals.

RESULTS

A total of 168 patients was recruited to the study and completed baseline surveys. Of these, 150 patients completed full follow-up at 6 months (89% follow-up). Information on RTW status by 6 months was available for 152 participants (90.4%). When contacted at 6 months, 2 participants indicated that they had not returned to work but declined to take part in any further interview. All participants were employed at the time of their injury; 14% were self-employed, 51,8% were blue-collar workers.

The mean age of the sample was 37.7 years and the cohort consisted primarily of men (75%). Using the ISS to classify injuries; 88 patients sustained minor injuries (ISS 1–8), 69 sustained moderate injuries (ISS 9–15) and 11 sustained major injuries (ISS > 15). Descriptive characteristics of the study sample are presented in Table I. The majority of orthopaedic injuries sustained were isolated or multiple injuries to the lower or upper extremities (Table II). One-third of the cohort presented with one or more co-morbid conditions at study entry. Ninety-one participants (56%) sustained an injury that provided entitlement to injury compensation.

Table I. *Descriptive characteristics of the study participants*

Variables	*n* (%)
General factors	
Mean age last birthday: 37.7 years (range: 18–62)	
Gender	
Male	126 (75.0)
Female	42 (25.0)
Pre-injury and post-injury health	
Co-morbid health conditions	
None	112 (66.7)
One or more	56 (33.3)
Pain experienced prior to injury[1]	
Yes	34 (21.0)
Post-injury self-reported general health[2]	
Good	75 (46.6)
Poor	86 (53.4)
Injury-related factors	
Injury required initial surgery	
Yes	119 (70.8)
Isolated vs Multiple injury	
Isolated	81 (48.2)
Multiple	87 (51.8)
Injury Severity Score	
Minor: 1–8	80 (47.6)
Moderate and Major: ≥9	88 (52.4)
Occupation-related factors	
Blue-collar worker	
No	87 (51.8)
Yes	81 (48.2)
Self-employed worker	
No	145 (86.3)
Yes	23 (13.7)
Work category	
Full-time	135 (80.4)
Part-time	33 (19.6)
Psychosocial factors	
Pain level (2 weeks post-injury)	
Low pain intensity	104 (61.9)
High pain intensity	64 (38.1)
Education	
Less than university	136 (81.0)
University	32 (19.0)
Psychological distress (2 weeks post-injury)[3]	
Normal	94 (58.4)
Depressed	67 (41.6)
Should not work with current level of pain (2 weeks post-injury)[4]	
Agree	103 (66.2)
Disagree	53 (33.5)
Receipt of compensation for injury[5]	91 (55.8)
Non-compensable	72 (44.2)
Recovery beliefs (2 weeks post-injury)[6]	
Strong	124 (77.0)
Low	37 (23.0)

Missing responses: [1]6, [2]2, [3]7, [4]13, [5]5, [6]7.

Table II. *Injury profile of study participants according to return to work at 6 months*

Site of injury	*n* (%)	Working at 6 months post-injury* Yes, *n*	No, *n*
Spinal injuries only	6 (3.6)	4	2
Isolated lower extremity injuries	41 (24.4)	30	8
Isolated upper extremity injuries	33 (19.6)	27	3
Multiple lower extremity injuries	30 (17.8)	17	12
Multiple upper extremity injuries	9 (5.4)	3	3
Orthopaedic injuries: multiple regions	31 (18.4)	13	15
Orthopaedic and other injuries	18 (10.7)	10	5
Total	168	104	48
		Sample: 152	

*Differences in numbers are due to loss to follow-up.

The median time to the first follow-up was 17 days, the second 82 days and the third 181 days. Nineteen percent of patients (30 participants) were able to RTW within 2 weeks of sustaining their injury, 44% of patients were back at work within 3 months (69 participants), and 68% (104 participants) had returned to work by 6 months. The majority of injured workers (94%) returned to the same employer. In the 6 cases that did not return to the same employer, they moved to an employer in a similar trade or skill area. Of those who returned to work, 44% returned to full duties and 56% returned to modified work.

Participants who sustained an isolated upper extremity injury (66.6%) were the most likely to RTW by 2 weeks. Over half of those who had sustained orthopaedic injuries to more than one region had not returned to work within 6 months. Eighty percent of workers who sustained minor injuries had returned to work by 6 months. In comparison, 42% of workers who sustained moderate injuries and 60% of workers who sustained major trauma remained off work at 6 months.

A total of 116 participants indicated that they received rehabilitation following discharge from the hospital at which they initially presented; 36 participants indicated that they did not require rehabilitation (Table III). Of those who required rehabilitation, 43 received the therapy as a hospital inpatient and the remainder as a hospital outpatient or in the community. When asked about the type of rehabilitation received, only 75 participants responded (data not shown). Most respondents indicated they required physiotherapy (58.6%); other therapies received included pain management, massage, vocational and light exercise. Participants who did not need rehabilitation were more likely to RTW by 6 months (χ^2 4.5, df 1, $p=0.034$).

Table III. *Mode of initial rehabilitation for study participants according to return to work at 6 months*

	n (%)*	Return to work at 6 months# RTW *n* (%)	Non-RTW *n* (%)
Received rehabilitation			
Hospital inpatient initially	43 (28.3)	21 (50.0)	21 (50.0)
Hospital outpatient/community based	73 (48.0)	50 (71.4)	20 (28.6)
Did not receive rehabilitation			
No rehabilitation	36 (23.7)	27 (81.8)	6 (18.2)

*Sample recruited at baseline; 16 missing responses.
#Differences in numbers due to loss to follow-up.

A comparison of those lost to follow-up with those who remained in the study revealed no significant differences with respect to age, gender, education, compensable status, injury severity or type of injury.

Factors affecting outcome

Univariate analyses revealed a strong association between a number of injury factors, including injury severity, an isolated vs multiple injury, initial need for surgery and RTW at all time-points. Psychosocial factors, including receipt of compensation, and pain attitudes, were strongly associated with RTW outcomes. In contrast, univariate analyses found no association between age, work category, being injured at work and prior pain with RTW. Gender was associated with blue-collar work and work category. The unadjusted association between the explanatory variables and RTW at the 3 time-points are presented in Table IV.

Multivariate analysis

In order to provide a basis for comparison of the importance of each factor as a predictor of RTW at each time-point, the analysis for all outcomes employed the same set of factors. The results are reported in Table V.

Return to work within 2 weeks

In the final multivariate model after adjusting for high initial pain, work category and gender, participants who were self-employed were more likely to RTW within 2 weeks (adjusted odds ratio (AOR) 5.75 (1.22–27.18)). An injury requiring initial surgery (AOR 0.31 (0.10–0.94)), older age (AOR 0.95 (0.91–0.99)) and participants who considered that they would be unable to work with their current level of pain (AOR 0.10 (0.029–0.37)) decreased the odds of RTW. Injury severity, receipt of compensation, high initial pain and isolated vs multiple injuries achieved significance at the univariate level, but were not significant predictors of RTW at the multivariate level, indicating the presence of confounding by other factors. The effect size associated with prior pain (AOR 3.36 (0.87–12.94)) suggests that this factor may be of clinical importance, although it did not achieve significance at the 0.05 level. The pseudo R-squared value of the final model was 43.6%.

Return to work within 12 weeks

In the final model after adjustment for gender, work category and initial pain intensity, participants were more likely to RTW if they had sustained an isolated injury (AOR 3.76 (1.38–10.22)), were educated to university level (AOR 6.27 (1.72–22.90)) and had strong recovery beliefs (AOR 16.73 (3.59–77.88)). Participants in receipt of compensation (AOR 0.23 (0.09–0.61)) or older (AOR 0.95 (0.92–0.99)) were less likely to RTW. There was an association between those

Table IV. *Univariate (unadjusted) association between the explanatory variables and return to work (RTW) outcomes*

Explanatory variable	RTW within 2 weeks RTW $n=30$ %	Non-RTW $n=161$ %	p	RTW within 12 weeks RTW $n=69$ %	Non-RTW $n=88$ %	p	RTW within 6 months RTW $n=104$ %	Non-RTW $n=49$ %	p
General factors									
Mean age, years	36.36	37.95	0.53	37.82	37.97	0.94	37.37	39.02	0.44
Proportion of females	8	33	1.00	21	20	0.36	32	8	0.08
Pre-injury and post-injury health									
Co-morbid health condition present	12	44	0.65	19	37	0.09	32	22	0.14
Pain prior to injury*	9	25	0.28	14	20	0.86	25	9	0.54
General health, good#	17	13	0.32	35	34	0.56	46	56	0.45
Injury-related factors									
Initial surgery required	16	96	0.04	42	67	0.06	64	40	0.03
Isolated injury	9	74	0.01	26	54	0.005	42	35	0.001
Injury Severity Score: ISS >9	7	69	0.007	24	50	0.01	38	32	0.001
Occupation-related factors									
Work category, full-time	24	106	1.00	55	71	1.00	80	41	0.52
Blue-collar worker	17	67	0.73	29	51	0.07	45	31	0.04
Self-employment	9	12	0.006	12	8	0.06	17	2	0.06
Psychosocial factors									
High initial pain intensity#	5	59	0.008	23	40	0.17	36	23	0.21
Education, university level	5	26	0.88	19	12	0.05	24	7	0.28
Psychological distress*#	9	58	0.22	24	42	0.14	44	18	0.60
Should not work with my current level of pain*#	12	91	0.001	34	69	0.001	59	40	0.009
Received injury compensation*	11	78	0.05	29	60	0.002	49	37	0.002
Recovery beliefs, strong*#	24	6	0.85	61	8	0.005	83	20	0.29

*Includes missing responses.
#Measured at 2 weeks post-injury.

who considered they should not work due to their current pain and RTW, although this did not quite achieve significance (0.052). Injury severity achieved significance at the univariate level, but was not a significant predictor in the final multivariate model when considered in the context of co-variates. An inspection of Leverage and Cook's distance identified the presence of an influential outlier. Removal of the outlier resulted in an improvement in the number of outcomes correctly classified by the model by more than 5% and the adjusted model was retained after first ensuring that the outlier did not reflect an error. The pseudo R-squared value for the final adjusted model after removal of the influential outlier was 46.1%.

Return to work within 6 months

In the final multivariate model, after adjustment for potential confounders, participants who returned to work within 6 months were more likely to have sustained an isolated injury (AOR 4.17 (1.40–12.45)), had reported symptoms of psychological distress at 2 weeks post-injury (AOR 3.21 (1.13–9.08))

Table V. *Prognostic factors for return to work at each follow-up time-point (odds ratios (adjusted) and 95% confidence intervals (95% CI))*

Explanatory factor	2 weeks post-injury OR (Adj)	95% CI	p	12 weeks post-injury OR (Adj)	95% CI	p	6 months post-injury OR (Adj)	95% CI	p
Age (continuous)	**0.95**	**0.91–0.99**	**0.046**	**0.95**	**0.92–0.99**	**0.032**	**0.94**	**0.91–0.98**	**0.012**
Pain prior to injury	3.36	0.87–12.94	0.067	0.765	0.262–2.23	0.624	1.75	0.54–5.63	0.350
Co-morbid health condition(s)	1.72	0.57–5.19	0.335	0.47	0.19–1.18	0.110	0.62	0.25–1.53	0.301
Injury Severity Score: ISS ≥9	0.45	0.13–1.58	0.217	0.52	0.20–1.35	0.18	0.47	0.18–1.26	0.134
Initial surgery required	**0.31**	**0.10–0.94**	**0.040**	0.59	0.22–1.58	0.300	0.57	0.19–1.68	0.314
Isolated injury	1.73	0.53–5.61	0.364	**3.76**	**1.38–10.22**	**0.009**	**4.17**	**1.40–12.45**	**0.010**
Blue-collar worker	0.72	0.32–3.71	0.887	0.53	0.21–1.41	0.21	**0.26**	**0.09–0.72**	**0.010**
Self-employment	**5.75**	**1.22–27.18**	**0.027**	1.21	0.29–5.02	0.791	3.63	0.65–20.19	0.141
Education: university	0.24	0.040–1.46	0.121	**6.27**	**1.72–22.90**	**0.005**	2.27	0.59–8.65	0.229
Received compensation	0.59	0.20–1.76	0.350	**0.23**	**0.088–0.610**	**0.003**	**0.27**	**0.096–0.75**	**0.012**
Psychological distress	0.55	0.16–1.83	0.078	1.44	0.55–3.72	0.451	**3.21**	**1.13–9.08**	**0.028**
Recovery belief, strong	0.60	0.12–3.00	0.539	**16.73**	**3.59–77.88**	**<0.001**	**3.99**	**1.11–14.52**	**0.035**
Should not work with my current level of pain, agree	**0.10**	**0.029–0.37**	**<0.001**	0.40	0.16–1.01	0.052	0.34	0.11–1.01	0.052
General health at 2 weeks, good	2.13	0.73–6.29	0.168	0.95	0.40–2.23	0.92	0.51	0.19–1.33	0.170

Bold values indicate significance.
OR: odds ratio; CI: confidence interval.

Table VI. *Reasons indicated by study participants for return to work (more than 1 response allowed)*

Reasons offered	*n* (%)
Financial security	56 (44.8)
Because I feel (medically) able to	22 (17.6)
To fill my day	17 (13.6)
To feel good or get injured body working again	13 (11.0)
Because I enjoy the responsibility of my work	7 (5.6)
My doctor told me to	3 (2.4)
Compensation system decision	3 (2.4)
Work needed him/her back	2 (1.6)
No sick leave left	1 (0.8)
Prefer not to answer	1 (0.8)
Total responses	125
Missing responses	1
Total returned to work	104

and had strong recovery beliefs (AOR 3.99 (1.11–14.52). Blue-collar workers (AOR 0.26 (0.09–0.72)), workers who were older (AOR 0. 94 (0.91–0.98)) or in receipt of compensation (AOR 0.27 (0.10–0.75)) were more likely to report ongoing work disability. The univariate association between gender and RTW to work at 6 months did not remain after controlling for the effects of co-variates. The pseudo R-squared value for the final model was 45.3%.

An inspection of parameter correlation estimates for all of the final models indicated that recovery beliefs and psychological stress were moderately inter-correlated (0.340–0.441) as was injury severity and sustaining isolated or multiple injuries (0.374–0.381). No potential interactions that were tested met the criteria to remain in the models.

Reasons for return to work

Participants who returned to work were asked what were their main reason(s) for returning to work after their injury. Responses were received from 99% of the participants who returned to work (Table VI). The most common response indicated was financial security (44.8%), followed by "because they were able to" (17.6%), and "to fill the day" (13.6%). Participants were able to provide more than one response; 75% of those who stated that financial security was the reason offered only this response. Sixty-eight percent of self-employed workers indicated that they returned to work for financial security.

DISCUSSION

In this study, predictive factors of first RTW of people employed at the time of the injury were investigated at 2 weeks, 12 weeks and 6 months post-injury. Sixty-eight percent of participants were able to RTW during the study and the majority returned to their former employment. Univariate analysis showed that the determinants of RTW varied according to the time of measurement. Significant determinants found in multivariate analysis at 2 weeks included self-employment and negative pain beliefs. At subsequent follow-up, the strongest independent predictors of outcome were compensation status, type of injury and recovery beliefs.

The comparison of RTW rates observed in this study and rates observed by others is limited by the timing of outcome measurements, different inclusion criteria, and different definitions of RTW. RTW rates may also be influenced by features of compensation systems as well as factors related to access to treatment and rehabilitation. The RTW rates reported in this study are consistent with findings from other studies that include similar injuries and follow-up periods and highlight the need for further consideration of minor and moderate orthopaedic injury cohorts (12, 13).

Many of the predictive factors for RTW found in this study are similar to those found in other trauma populations, including those sustaining whiplash, and cumulative trauma musculoskeletal samples (32, 33). Consistent with a number of studies, younger age and higher education levels were associated with RTW (9, 12, 34). In common with other studies, gender was not a significant predictor of RTW (12, 14, 34). Our study sample included a similar proportion of males to these studies.

At the time of the first follow-up (median 17 days post-injury) approximately 10% of the study sample remained in hospital. Not surprisingly, injury factors were important at this time-point. Self-employment was a positive determinant of RTW after adjustment for injury severity and other co-variates. Self-employed workers have limited entitlements under the Victorian workers compensation scheme (24) and without income protection insurance would be eligible for only limited wage replacement through the social security system in the event of extended disability. Due to the lack of insurance coverage, self-employed workers may be more motivated to RTW earlier regardless of the nature of their injury.

An important early predictor of RTW was pain attitudes in relation to work, as measured by a single item adapted from the SOPA (27). Persons with negative pain beliefs were more likely to experience work disability, and while this variable failed to reach significance at later time-points, the effect size associated with it suggests that in a larger sample it would be present as a statistically significant factor. Recovery expectations have been demonstrated to be a strong predictor of RTW in both trauma and non-trauma studies of musculoskeletal injuries (25, 33, 35). In the current study, participants reporting strong recovery beliefs had 16.7 times the odds of RTW by 12 weeks and 3.9 times the odds of RTW by 6 months. Strong recovery beliefs are a form of self-efficacy and are associated with increased coping and self-management (36). Hou et al (12). report an adjusted relative rate ratio of 11.14 for worker, compensation group who reported very high self-efficacy in a 6-month study of RTW following injury to the extremities.

In keeping with many studies, the receipt of compensation was associated with lower likelihood of RTW at both the 12 week and 6 month time-points. Explanations of the role of compensation as a predictor of RTW behaviour are controversial and there are a number of hypotheses as to the reason for slower RTW. One relates to the purported secondary gain by injured patients and another reflects the anti-therapeutic effects of involvement in the compensation system (17). It is not possible to test the validity of either hypothesis in the current study. While only 56% of participants received compensation, we did not establish what that entailed, and only 9,9% participants indicated that they were pursuing litigation.

Depression has been identified as a significant predictor of work disability in individual studies of acute trauma (11), although in other musculoskeletal samples it is not predictive of RTW (33). Depression may contribute to work disability by limiting the effectiveness of treatment and rehabilitation programmes. In this study, psychological distress was a positive predictor of RTW at 6 months. This finding is perhaps unexpected, but it may be that the early identification of psychological distress resulted in successful treatment by the 6-month follow-up.

In the current study, 116 participants received some form of rehabilitation following discharge from the hospital at which they first presented; 73 participants received rehabilitation in the community and the remainder received it initially as a hospital inpatient and subsequently in the community. While physiotherapy was the most common form of rehabilitation received, missing data limits interpretation of the form of rehabilitation. Those participants who did not need rehabilitation returned to work earlier than participants requiring rehabilitation, suggesting that the need for rehabilitation may be a proxy measure of injury severity. Given this, rehabilitation could not be evaluated in terms of whether it was a determinant of RTW and thus was not included in the multivariate analysis. This finding warrants further study.

In this study, models of RTW were fitted at 3 post-injury time-points. All models included the same factors and were similarly adjusted. The concordance of the majority of significant predictive factors at the latter time-points is of importance in the early prediction of those at risk of not returning to work and thus in need of further intervention (1, 22). Given the nature of the injuries sustained, it might be expected that many of the factors associated with the latter time-points were not predictive at 2 weeks.

Reasons for return to work

In this study, the major reasons stated by participants for RTW were financial security, "to fill the day", and "because they felt able to". Few studies have considered the participants viewpoint in this regard. Campbell Research and Consulting (37) annually survey over 3000 injured workers across all Australian workers compensation systems with respect to the main reasons for RTW. In the 2006–2007 report, the main reasons included being recovered (48%), followed by "I wanted to" (29%), and economic need (28%) . In the current study, 46% of participants indicated financial security as a significant reason for RTW. The difference may reflect that the majority of participants were not entitled to compensation and thus may be more motivated by financial need to RTW once their sick leave is exhausted. Understanding the different motivations for RTW may provide opportunities for social marketing aimed at reducing the burden associated with ongoing work disability.

Strengths and limitations

The strengths of this study include its prospective longitudinal design, predictive strength of odds ratios and high follow-up rate. The study is limited by its small sample size, which restricts the number of factors that can be assessed and affects the power of the study and its ability to detect effects. A number of factors failed to reach statistical significance, but had large effect sizes suggesting that they might be important. The heterogeneous nature of injuries means that conclusions with respect to particular injury types are limited. It would have been helpful to record the post-hospital discharge location, as this has been shown in some studies to be predictive of RTW (6). Other potential limitations include the use of a single item from the SOPA as a marker of pain attitudes, as this approach has not been validated in an orthopaedic trauma population, as well as the relatively short length of participant follow-up.

In conclusion, the findings of this study indicate that a number of demographic, injury, occupation and psychosocial factors were significant predictors of RTW in a sample that had sustained minor and moderate non-life-threatening orthopaedic trauma. The relative importance of the factors at different time-points confirms that RTW reflects a multifactorial process involving a complex interaction of many factors interacting in a time-dependent manner. These results need to be confirmed in larger studies and with more homogenous injury populations. The findings highlight the need to further assess functional outcomes following minor and moderate injury and provide additional evidence that RTW cannot easily be explained within a biomedical model that focuses only on factors related to the physical injury.

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