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Perspectives from Employers, Insurers, Lawyers and Healthcare Providers on Factors that Influence Workers' Return-to-Work Following Surgery for Non-Traumatic Upper Extremity Conditions

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Abstract
Purpose Return-to-work (RTW) stakeholders have varied roles and may therefore hold their own perspectives regarding factors that may influence outcomes. This study aimed to determine stakeholders' perspectives on factors influencing RTW following surgery for non-traumatic upper extremity conditions.
Methods A questionnaire was distributed to RTW stakeholders via gatekeeper organizations. Stakeholders rated 50 potential prognostic factors from 'not' to 'extremely' influential. Data were dichotomized to establish stakeholders' level of agreement. Disagreements between stakeholder groups were analyzed using χ^2. The relationship between stakeholder demographic variables and rating of a factor was determined via regression analysis.
Results One thousand and eleven stakeholders completed the survey: healthcare providers (77.8 %); employer representatives (12.2 %); insurer representatives (6.8 %); and lawyers (3.2 %). Factors with the highest stakeholder agreement for influencing RTW were: self-efficacy (92.2 %); post-operative psychological status (91.8 %); supportive employer/supervisor (91.4 %); employer's willingness to accommodate job modifications (90.7 %); worker's recovery expectations (88.3 %); mood disorder diagnosis (86.6 %); post-operative pain level (86.4 %); and whether the job can be modified (86.3 %). Disagreements between stakeholder groups were found for 19 (36 %) factors. The strongest disagreements were for: age; gender; obesity; doctor's RTW recommendation; and presence of a RTW coordinator. Respondents' characteristics (e.g., age, workers' compensation jurisdiction, work experience, stakeholder group) were associated with factor rating.
Conclusion The factors stakeholders rated as having the greatest influence on RTW were predominately psychosocial and modifiable. These variables should be the focus of future research to determine prognostic factors for RTW for workers with upper extremity conditions, and to develop effective RTW interventions.

Keywords Hand · Wrist · Shoulder · Workers' compensation · Prognosis · Disability

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Introduction

The incidence of upper extremity symptoms in the working population has been reported to be as high as 53 % [1]. In Australia from 2001 to 2012, claims requiring time off work increased by over 70 % to a median claim cost of approximately USD7000 and a return-to-work (RTW) duration of nearly 6 weeks [2]. Of these, more were related to the upper extremities than to any other bodily location

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[2]. Similarly high rates for upper extremity conditions and costs have been found in other jurisdictions internationally [3]. Non-traumatic conditions of the upper extremity, such as carpal tunnel syndrome and tendinopathies of the shoulder, wrist and hand, account for a significant proportion of these upper extremity conditions. Surgery (e.g., carpal tunnel release, rotator cuff decompression) is frequently offered to workers with more severe symptoms or those who do not respond adequately to conservative management. However, despite surgical intervention, delayed RTW and long-term work disability often persists [4, 5].

There are many stakeholders whose role it is to assist in the recovery process and support injured workers to return to work safely and quickly. The stakeholders involved often play an important role in both identifying factors influencing RTW outcomes and establishing interventions that facilitate an early and safe RTW [6, 7]. In the Australian workers' compensation setting, key stakeholders consist of injured workers, employers, administrators/insurers and external service providers, e.g., healthcare providers [8].

Many factors have been identified that are associated with a delayed RTW [9]. However, previous research has tended to focus on workers with diagnoses such as low back pain [10–12], trauma [13, 14] and mental health [15]. Furthermore, research on stakeholder perspectives have often used qualitative research designs [16–22]. Little is known about the perspectives of stakeholders involved in the RTW process who may yield valuable real-world experience of the factors influencing RTW for workers with upper extremity conditions. Therefore, the purpose of this study was to determine stakeholder's perspectives on factors that influence a worker's ability to RTW following surgery for a non-traumatic upper extremity conditions. The main research questions were:

1. What factors do stakeholders identify as being influential on a worker's ability to RTW following surgery for a non-traumatic musculoskeletal disorder of the upper extremity?
2. What, if any, differences exist between the stakeholder groups?
3. What demographic and job-related variables of the respondents influence the rating of a factor?

Methods

A cross-sectional study of RTW stakeholders was conducted across all states of Australia between August 2013 to January 2014 using both web-based and hard-copy questionnaires.

Survey Questionnaire

The factors for the questionnaire were developed based on systematic reviews in the work disability field [9–13, 15, 23–27] with 48 factors identified as potentially influencing RTW. Similar factors from the reviews were discussed by members of the research team to create a succinct list for ease of participant completion. The survey was piloted among ten stakeholders representing each stakeholder group. Each stakeholder had greater than 10 years experience managing or dealing with workers who have upper extremity conditions. They provided feedback on the survey, including content, item structure and clarity. They suggested two additional factors they thought had been omitted from the original list but felt were important in the Australian context (who the insurer was managing the claim; the worker having a pre-employment medical evaluation). Responses were collated and changes made to the survey. The stakeholders who completed the pilot approved the final survey. They agreed that the final questionnaire provided a comprehensive list of potential prognostic factors relevant to the Australian workers' compensation setting.

For the survey we categorized the 50 factors into four sections including 8 socio-demographic, 16 worker-related (e.g., pain, psychological status), 19 workplace and 7 compensation/procedural factors. The section headings were based on the feedback provided in the first round of the pilot phase. Participants completed demographic information and were asked to rate how influential 50 factors were on RTW. The survey was structured with an opening question at the start of each section: "*Please rate the degree of influence you think these work-related (or socio-demographic, or compensation or worker-related) factors have on a worker's ability to return to work" with respect to workers who have had surgery for a non-traumatic upper extremity condition*. Participants were provided with examples of the types of conditions such as carpal tunnel syndrome, rotator cuff tendinopathy, lateral epicondylalgia, trigger finger. Under each section question there was a list of factors that participants were asked to rate on a five point Likert scale, ranging from "1- Not at all influential" to "5- Extremely influential", with a separate option for "No opinion".

Appropriate ethical approvals were obtained from the Medical Research Ethics Committee from The University of Queensland. Informed consent was obtained from all individual participants included in the study.

Reliability

Reliability between electronic and hard copy formats for the 50-factor questionnaire was established using the ten

stakeholder representatives who participated in the survey pilot. Hard-copy and electronic copies were administered at least 1 day apart to establish reliability of the formats. Weighted kappas were calculated for each factor in its original (5-point scale) format and kappa statistics for the factors in their dichotomized state. Reliability results for both kappa statistics found that all kappa values were above 0.74. These findings are in agreement with a recent systematic review, which found paper-based and web-based questionnaires were reliable when used interchangeably [28].

Participants and Recruitment

Key stakeholders were identified from four groups nominated in the work disability model developed by Loisel et al [29]: healthcare providers; employer representatives; insurer representatives; and legal counsel. Our study did not include workers' perspectives as these are being studied separately using different methods.

Key gatekeeper organizations for healthcare provider and insurer groups distributed the survey via email and/or in the organization's newsletter (see *Acknowledgements* for a list of the organisations). We also engaged in key stakeholder events, such as conferences. Participants were provided with a link to the electronic survey or with a hard copy survey to complete. We utilized a "snow-ball" method whereby participants were encouraged to forward this link to other stakeholders who managed workers with upper extremity conditions. Hard copy data was later entered into survey monkey for analysis.

Compensation Setting

The study was conducted in Australia, which has systems for sickness and disability support, and compensation coverage for motor vehicle and workplace injuries. It comprises of the following key elements (Fig. 1): a universal healthcare scheme supplemented by private health insurance; sick leave entitlements under national labor laws; social security benefits including both temporary sickness allowances and longer-term disability pensions; state statutory no-fault cause-based compensation schemes for motor-vehicle and work-related injury; common law damages claims for pain and suffering and economic loss arising out of negligence.

Workers' compensation for work-related conditions is provided to eligible workers. In general, it is regulated within each State (or Territory) of Australia. Queensland, Victoria, South Australia as well as employees of the Australian Government are managed by a state-based central government-managed fund; where as New South Wales, Western Australia, Tasmania, Northern Territory and Australian Capital Territory are managed by external private funds that are regulated by the state government. There are other small differences between the schemes [30].

Key stakeholders involved in the RTW process include those that are the focus of this study. The recommended model for service delivery by Australian professional medical compensation associations for stakeholders in the system is the biopsychosocial model [31–34].

Statistical Analysis

Data were imported from Survey Monkey into SPSS (Statistics for Mac, Version 22, IBM, Armonk NY, 2013) for analysis. Statistical significance was set at 0.05. Descriptive statistics were used to profile the participants. The data from the Likert scale responses were dichotomized with the responses "1- Not at all influential", "2- Slightly influential" and "3- Somewhat influential" forming one category, while the second category contained the "4- Very influential" and "5- Extremely Influential" responses. The dichotomized cut-off was determined by the factors that stakeholders perceived as having the greatest influence on RTW. The "No-opinion" responses were not counted in the analysis as it was unknown why the stakeholder may have selected this response (e.g., not familiar with the factor, did not understand the factor, or unsure whether the factor was influential or not). Frequency data were tabulated for the categorical values. Pearson Chi-Square statistics were used to determine the level of disagreement between stakeholders for each of the 50 factors. For factors with less than five counts per cell in the contingency table, Fisher's Exact Test was used. A hard cutoff of 75 % was used as a consensus of stakeholder agreement (that is, we did not round up factors 74.5–74.9 %) [35]. The biopsychosocial model was used to organize the factors into the biological, psychological and social domains. This model was selected as the World Health Organization (WHO) international classification for functioning health and disability is based on the biopsychosocial model [36]. It has been recommended as a model for understanding and managing work-related upper extremity musculoskeletal disorders [37], and more broadly for other work-related conditions [38]. The biopsychosocial model is also the recommended model for service delivery by Australian professional associations and workers' compensation insurers [31–34]. We used the definitions for the domains as proposed by Waddell and Burton [38]:

- Biological: physical or mental health condition (e.g., physiology, dysfunction, tissue damage);
- Psychological: personal/psychological factors influence functioning, so that the individual must take some personal responsibility for his/her behavior (e.g., illness behavior, beliefs, coping strategies, emotions, distress);

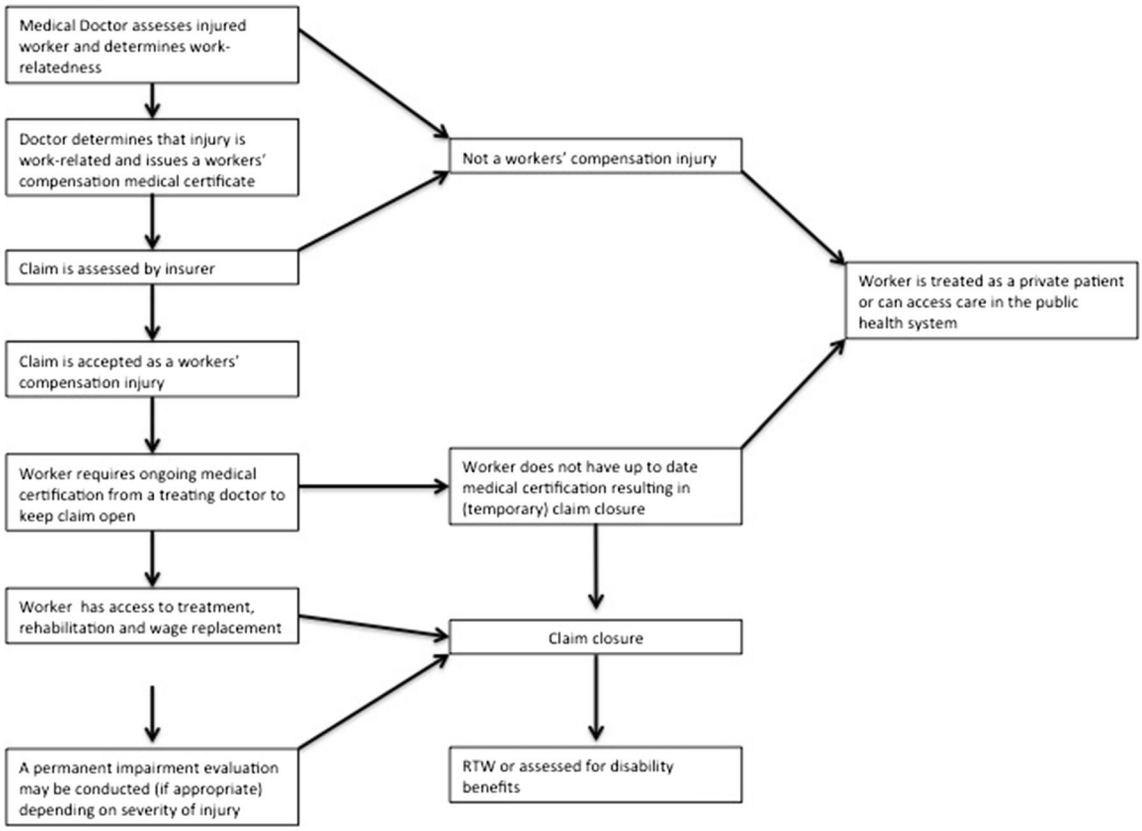

Fig. 1 Australian workers' compensation process

- Social: social context, pressures and constraints placed on behavior and functioning (e.g., culture, social interactions).

Logistic regression was performed to evaluate the impact of respondents' demographic variables on the likelihood of rating a response as either 'not to somewhat influential' or 'very to extremely influential'. The variables entered into the model were: age; sex; occupation category; percentage of their work that involves workers with upper extremity conditions; percentage of workers they manage who receive workers' compensation; years experience working in their current role; and whether they work primarily in a workers' compensation jurisdiction that has a centrally or externally managed fund [30]. Participants who did not nominate a profession were not included in the logistic regression analysis.

Results

One thousand and twenty-two stakeholders participated in the study (hard-copy ($n = 48$); web-based ($n = 974$)). Twelve respondents did not complete >80 % of the questionnaire and were therefore excluded, leaving 1011 responses for analysis. Table 1 contains the demographic information of the sample. Stakeholders included healthcare providers (77.8 %), employer representatives (12.2 %), insurer representatives (6.8 %) and lawyers (3.2 %). Ten participants (<1.0 %) did not indicate their profession. Most participants were female (65.8 %); aged between 30 and 49 years (31 %); and had more than 10 years experience working in the field (55.1 %). The majority of the stakeholders managed at least 11 workers with upper extremity disorders per month. Forty-six percent indicated that greater than 50 % of their caseload was funded through a workers' compensation insurer.

Agreement (>75 %) on Factors Influencing a Worker's Ability to Return to Work

Stakeholders' responses to the questionnaire for all 50 factors are detailed in Table 2 and the dichotomized responses illustrated in Fig. 2. Stakeholders agreed on twenty-one factors that they perceived influenced a worker's ability to return to work following upper extremity surgery and two factors they perceived were 'not to somewhat' influential on RTW.

The factors that stakeholders perceived were 'very to extremely influential' on RTW included three biological factors, seven psychological factors and 11 social factors. The *biological* factors were: post-operative pain level

Table 1 Demographic profile of stakeholder groups (N = 1011)

Total	Healthcare *n* (%) 787 (77.8)	Employers *n* (%) 123 (12.2)	Insurers *n* (%) 69 (6.8)	Lawyers *n* (%) 32 (3.2)	All *n* (%) 1011
Gender					
Female	515 (65.4)	88 (71.5)	49 (71)	13 (40.6)	665 (65.8)
Male	272 (34.6)	35 (28.5)	20 (29)	19 (59.4)	346 (34.2)
Age					
21–29 years	142 (18)	11 (8.9)	12 (17.4)	6 (18.7)	171 (16.9)
30–39 years	242 (30.8)	38 (30.9)	26 (37.7)	7 (21.9)	313 (31)
40–49 years	193 (24.5)	35 (28.5)	19 (27.5)	7 (21.9)	254 (25.1)
50–59 years	130 (16.5)	34 (27.6)	9 (13.1)	12 (37.5)	185 (18.3)
≥60 years	80 (10.2)	5 (4.1)	3 (4.3)	0	88 (8.7)
Years working in current profession					
Less than 1 year	29 (3.7)	3 (2.4)	8 (11.6)	1 (3.1)	113 (11.1)
1–5 years	133 (16.9)	39 (31.7)	27 (39.1)	3 (9.4)	202 (20.0)
6–10 years	161 (20.5)	30 (24.4)	8 (11.6)	0	199 (19.7)
>10 years	464 (59)	51 (41.4)	26 (37.7)	16 (50)	557 (55.1)
Not reported	0 (0.0)	0 (0.0)	0 (0.0)	12 (37.5)	12 (1.2)
Fund Type					
Centrally managed	360 (45.7)	86 (69.9)	60 (87)	21 (65.6)	527 (52.1)
Privately insurer/managed	405 (51.5)	24 (19.5)	8 (11.6)	11 (34.4)	448 (44.3)
Both/ Unknown/Not reported	22 (2.8)	13 (10.6)	1 (1.4)	0 (0.0)	36 (3.6)
Number of workers with upper extremity conditions managed/month					
<5	171 (21.7)	86 (70)	10 (14.5)	14 (43.8)	281 (27.8)
6–10	140 (17.8)	17 (13.8)	24 (34.8)	4 (12.5)	185 (18.3)
11–20	125 (15.9)	9 (7.3)	19 (27.5)	5 (15.6)	158 (15.6)
21–50	107 (13.6)	10 (8.1)	9 (13)	4 (12.5)	130 (12.9)
>50	165 (21)	0	2 (2.9)	1 (3.1)	168 (16.6)
Not reported	79 (10)	1 (0.8)	5 (7.3)	4 (12.5)	89 (8.8)
Percentage workers managed that are claiming workers' compensation					
0 %	0 (0.0)	11 (8.9)	1 (1.4)	2 (6.3)	14 (1.4)
1–25 %	195 (24.8)	43 (35.0)	7 (10.1)	6 (18.8)	251 (24.8)
26–50 %	160 (20.3)	14 (11.4)	12 (17.4)	5 (15.6)	191 (18.9)
51–75 %	132 (16.8)	5 (4.1)	13 (18.8)	10 (31.3)	160 (15.8)
>75	221 (28.1)	49 (39.8)	31 (44.9)	5 (15.6)	306 (30.3)
Not reported	79 (10.0)	1 (0.8)	5 (7.2)	4 (12.5)	89 (8.8)

(86.4 %); poor overall body function (75.9 %); and two or more musculoskeletal pain sites (75.4 %). The *psychological* factors were: worker displays difficulty coping with pain/injury (94.8 %); worker's RTW self-efficacy (92.2 %); post-operative psychological status (91.8 %); worker's recovery expectations (88.3 %); worker's job satisfaction (87.7 %); diagnosed mood disorder e.g., depression, anxiety (86.6 %); and pre-operative psychological status (82 %). The *social* factors were: supportive employer or supervisor (91.4 %); employer's willingness to accommodate job modifications (90.7 %); availability of alternate or suitable duties (86.6 %); whether the job can be modified (86.3 %); worker's perception that the job can be modified (84 %); exposure to hand and wrist repetition at work (82.3 %); exposure to heavy lifting at work (81.4 %); supportive work colleagues (78.2 %); supportive family or spouse (77.2 %); whether the worker has sought legal advice (75.5 %); and amount of control a worker has over his/her job (75.4 %).

Factors that stakeholders agreed were least influential on RTW were gender (89.5 %) and whether the worker had a pre-employment medical evaluation (84.1 %).

Poor Agreement (<75 %) on Factors Influencing a Workers' Ability to RTW

There was less consensus for 27 (54 %) of the factors (Fig. 2).

Table 2 Stakeholder rating of factors using the 5-point Likert scale

Factor	1 Not influential %	2 Slightly influential %	3 Somewhat influential %	4 Very Influential %	5 Extremely influential %
Biological					
Post-operative pain level	0.7	2.0	11.0	46.0	40.4
Poor overall body function prior to the surgery	1.1	2.9	20.1	43.4	32.5
Two or more musculoskeletal pain sites	1.1	2.6	20.9	46.8	28.7
Pre-operative pain level	1.2	7.5	29.9	40.3	21.1
Upper extremity diagnosis	1.8	8.4	28.5	37.6	23.7
Health-related comorbidities	1.3	10.6	31.5	36.1	20.5
Obesity	2.7	14.4	37.0	27.2	18.8
Pre-operative cardiovascular fitness	4.2	20.5	42.0	22.9	10.5
Smoker	8.8	25.1	35.2	20.3	10.6
Psychological					
Worker displays difficulty coping with pain/injury[a]	0.4	0.4	4.4	32.0	62.8
Worker's RTW self-efficacy	0.4	0.7	6.7	32.1	60.1
Post-operative psychological status	0.5	0.8	6.9	32.5	59.3
Worker's expectation r.e. their recovery	0.5	0.8	10.4	39.0	49.3
Diagnosed mood disorder[a]	0.4	2.1	10.1	33.0	54.5
Pre-operative psychological status	0.5	1.7	15.8	33.9	48.0
Worker has alcohol/drug abuse problem	1.8	8.9	25.8	32.7	30.8
Psychological aspects of work					
Job satisfaction[a]	0.5	1.3	10.5	34.0	53.6
Psychosocial demands of the workplace[a]	0.5	3.7	23.6	41.8	30.4
Social					
Supportive employer/supervisor[a]	0.5	0.8	7.2	34.6	56.8
Employer's willingness to accommodate job modifications	0.7	0.5	8.1	34.2	56.5
Availability of alternate/suitable work tasks	0.9	2.5	9.9	37.7	49.0
Whether the job can be modified on the worker's RTW	1.0	2.0	10.7	41.6	44.6
Worker's perception that the job can be modified	0.9	1.7	13.4	41.5	42.4
Exposure to hand/wrist repetition at work	0.7	1.7	15.4	42.7	39.6
Exposure to heavy lifting at work	0.8	2.4	15.4	44.1	37.3
Supportive work colleagues[a]	0.9	3.4	17.4	41.4	36.8
Supportive family or spouse[a]	0.7	2.6	19.5	41.3	35.9
Whether the worker has sought legal advice	1.6	6.2	16.7	31.2	44.3
Amount of control worker has over job	0.9	2.9	20.8	43.0	32.5
Having a structured Suitable Duties Program	0.4	3.8	21.3	41.5	33.0
Doctor's recommendation for work absence	0.8	4.1	20.9	38.6	35.6
Exposure to frequent bending or twisting of arm at work	0.7	4.2	22.9	44.9	27.3
Worker's compensation experience	1.3	6.1	20.5	40.2	31.9
Claiming workers' compensation	2.2	5.9	21.6	33.9	36.4
Policies and practices of the workplace	0.7	6.0	23.6	42.1	27.7
Worker is the primary breadwinner	3.2	5.4	22.5	37.8	31.1
Exposure to vibration at work	1.5	5.3	25.5	42.4	25.3
Worker is claiming third party insurance/compensation	1.4	4.7	27.1	37.2	29.5
Worker's understanding of the compensation system	2.0	5.5	29.7	39.9	22.9
Multiple HCPs involved in worker's treatment[a]	0.8	4.1	20.9	38.6	35.6
Presence of in-house RTW coordinator	1.9	14.3	36.0	30.2	17.6
Which insurer is managing the claim	10.3	19.9	36.6	21.7	11.5

Table 2 continued

Factor	1 Not influential %	2 Slightly influential %	3 Somewhat influential %	4 Very Influential %	5 Extremely influential %
Whether the worker had a pre-employment medical evaluation in the last 12 months	25.3	35.7	23.1	9.9	6.0
Demographic					
Worker's occupation	0.8	3.3	21.2	42.8	31.9
Education level of worker	4.0	11.4	34.6	33.3	16.8
Annual income	8.1	14.9	33.3	27.5	16.2
Worker's age	4.6	15.5	37.0	31.4	11.5
Hand dominance	15.5	16.0	29.9	25.8	12.8
Ethnicity	12.4	23.5	36.5	18.2	9.4
Gender	31.7	26.8	31.0	8.3	2.1

[a] These factors have an interaction with another domain of the biopsychosocial model

Differences in Agreement Between Stakeholder Groups

There were also significant differences in the level of agreement between stakeholder groups for 19 (38 %) of the 50 factors (Table 3). Stakeholders disagreed on the degree of influence on three biological factors (health-related comorbidities; obesity; pre-operative cardiovascular fitness); eleven *social* (exposure to heavy lifting; exposure to repetition; job control; job modification available; supportive work colleagues; having a structured SDP; presence of an in-house RW coordinator; pre-employment medical evaluation; claiming workers' compensation; legal involvement; doctor's recommendation for time off work), and four *demographic* (age; gender; education level; hand dominance). There were no disagreements between stakeholder groups for the *psychological* factors.

Influence of Demographic and Employment-Related Variables of the Respondents on Factor Rating

Stakeholder group affiliation, years of experience, and management of more upper extremity conditions, gender and age influenced the rating of 34 factors. Demographic and employment related variables that were associated with a respondent being more likely to rate a factor being more influential on RTW can be viewed in Table 4.

Discussion

The purpose of this study was to determine stakeholders' perspectives on the factors they perceive influence a worker's ability to return to work following surgery for a non-traumatic musculoskeletal disorder of the upper extremity. Furthermore, the study aimed to determine whether these opinions differed between stakeholder groups or with respect to the demographic data of the respondents.

Overall, >75 % of respondents (irrespective of stakeholder group) agreed on 46 % of the factors' influence on RTW. Less consensus (<75 %) was found for 27 factors. There were statistically significant differences between stakeholder groups for 19 (36.5 %) factors. In addition, we also found that there were a number of respondent-related (demographic and employment) variables that influenced stakeholders' rating of certain factors.

Agreement (>75 %) on Factors Influencing a Worker's Ability to Return to Work

More than 75 % of respondents agreed on 21 factors that they perceived were greatly to extremely influential on RTW following surgery for upper extremity conditions and two factors they perceived as being least influential. When applying the biopsychosocial model to the factors identified, most were from the social domain, and more specifically, the workplace. Whilst the literature supports the importance of psychosocial factors influencing RTW [39–41], what is interesting is that some of the specific factors that were identified by stakeholders have conflicting evidence for their prognostic effect on RTW outcomes in the literature. These will be discussed below.

In a recent systematic review of prognostic factors for RTW following carpal tunnel surgery, a number of work-related factors were found to be prognostic in one or more studies: less supportive workplace, less supportive co-workers, job dissatisfaction, high job strain, exposure to

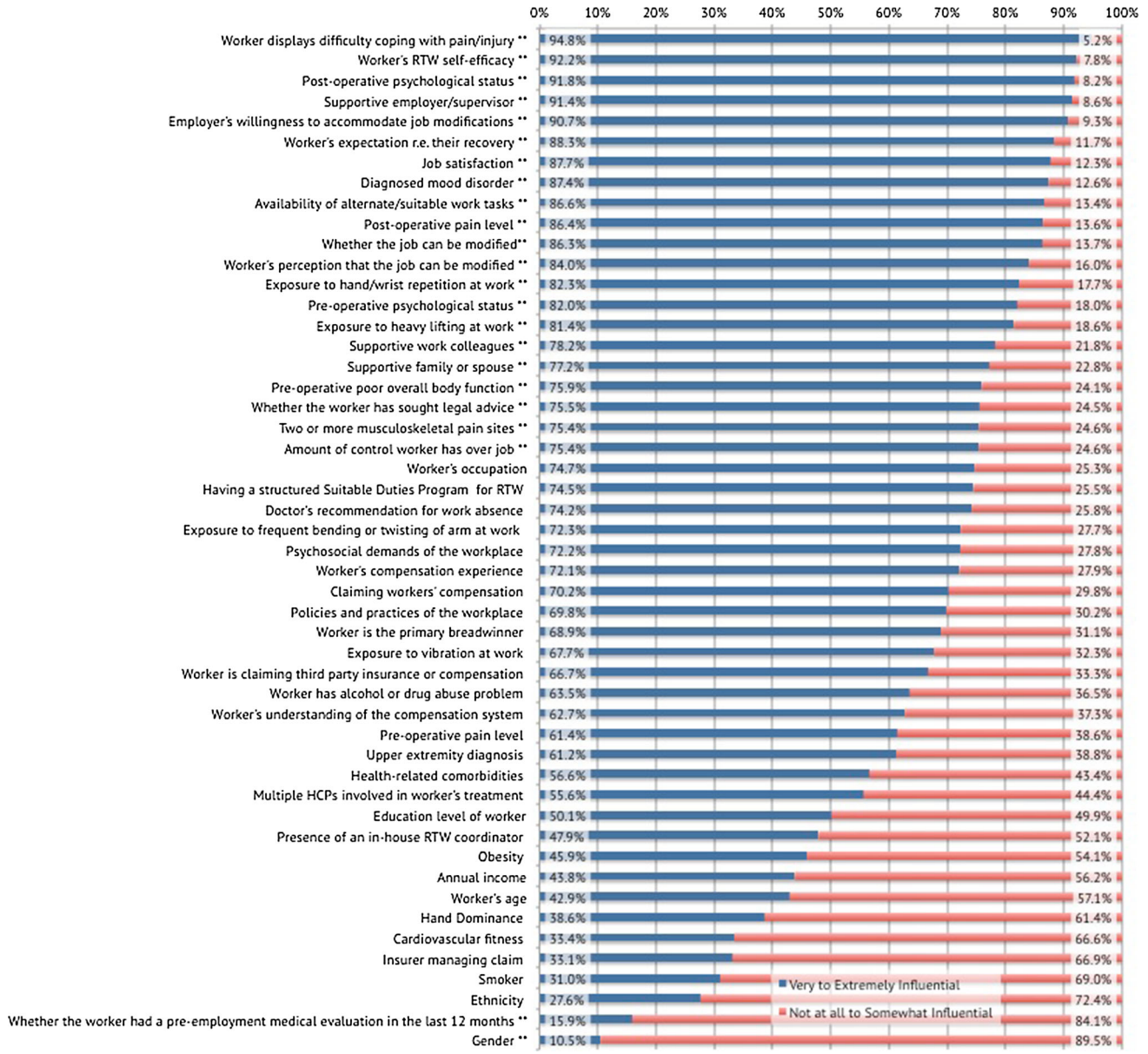

Fig. 2 Stakeholders' dichotomized responses for all variables **factors that reached agreement (≥75 %) of stakeholders

bending or twisting of the hands, exposure to heavy lifting, exposure to repetition, and worker's RTW expectations [23]. In the same review, job accommodation was found to be prognostic for a better RTW outcome, but not for a poorer outcome. In our study, we found that multiple factors related to job accommodation were thought to have a strong influence on RTW. These included a worker's perception of how the job can be modified and the willingness of employers to modify jobs to accommodate a worker's impairments. Workplace-related barriers have also been highlighted as important prognostic factors for RTW for workers with back pain [11]. Steenstra et al [11] also suggested that the nature of the support received from stakeholders might impact on the success of workplace interventions. Therefore based on our findings and those from the existing literature it might be beneficial for interventions to include components that focus on stakeholder education to improve both processes for identifying barriers to RTW and facilitating job accommodation.

Our study also found that stakeholders considered supervisor support and worker's job control important. Previous studies have focused on supporting supervisors in their role in managing injured workers [42, 43]. This is also supported by various studies on the unique role and importance of supervisor support in the RTW process [17, 18, 44]. However, conflicting evidence exists for both co-worker support and supervisory support from the results of a systematic review on carpal tunnel surgery [23]. This

Table 3 Factors for which stakeholder groups disagreed

Variable	Percentage of stakeholders that selected the dichotomized group of 'very to extremely influential'					Pearson's χ^2
	HCP	Insurer	Employer	Lawyer	All groups	
Demographic						
Age	38.4	55.3	59.8	77.8	42.8	X^2 (3) = 28.03, $p < 0.0001$
Gender	7.9	13.3	22.0	29.4	10.5	X^2 (3) = 23.80, $p < 0.0001$
Annual income	41.2	51.1	58.7	33.3	43.8	X^2 (3) = 11.77, $p = 0.008$
Education level	52.3	47.8	36.6	50	50.1	X^2 (3) = 8.11, $p = 0.044$
Hand dominance	36.0	47.8	45.6	66.7	38.6	X^2 (3) = 11.15, $p = 0.011$
Biological						
Health-related comorbidity	53.7	70.2	70.8	47.1	56.6	X^2 (3) = 13.57, $p = 0.004$
Obesity	41.8	60.9	64.1	47.1	45.9	X^2 (3) = 20.36, $p < 0.0001$
Pre-operative cardiovascular fitness	30.3	40	49.4	35.3	33.4	X^2 (3) = 13.68, $p = 0.003$
Social						
Exposure to heavy lifting	79.4	89.1	87.2	100	81.4	X^2 (3) = 9.69, $p = 0.021$
Exposure to upper extremity repetition	80.1	89.1	89.5	100	82.3	X^2 (3) = 10.70, $p = 0.013$
Job control	78.0	59.6	66.3	77.8	75.4	X^2 (3) = 12.89, $p = 0.005$
Job modification available	87.1	93.6	76.8	88.9	86.3	X^2 (3) = 9.71, $p = 0.021$
Supportive work colleagues	75.4	85.4	92.6	77.8	78.2	X^2 (3) = 15.56, $p = 0.001$
Having a structured SDP	71.9	83.0	86.2	77.8	74.5	X^2 (3) = 10.72, $p = 0.013$
Presence of in-house RTW coordinator	43.1	61.7	73.4	33.3	47.9	X^2 (3) = 35.0, $p < 0.0001$
Pre-employment medical evaluation	14.7	10.0	25.9	12.5	15.9	X^2 (3) = 7.99, $p = 0.046$
Claiming workers' compensation	65.3	82.6	71.0	50.0	66.7	X^2 (3) = 8.77, $p = 0.033$
Legal involvement	74.3	87.5	82.6	44.4	75.5	X^2 (3) = 16.06, $p = 0.001$
Doctor's recommendation for time off work	70.6	89.6	89.5	72.2	74.2	X^2 (3) = 21.53, $p < 0.0001$

could perhaps suggest that supervisory support may be more relevant for some types of injuries or job demands. However it is important to note, that there is a dearth of prognosis studies for non-traumatic upper extremity diagnoses, outside of carpal tunnel surgery, for comparison. Hence, this could simply be due to the lack of high quality studies on this topic for upper extremity conditions.

Psychological factors including psychological state, recovery expectations and RTW self-efficacy, were rated as factors with a high influence on RTW. While it is not conclusive that psychological status is prognostic for RTW [23], a number of studies have shown that low recovery expectations [45, 46] and poor self-efficacy [11, 13] do play an important role in influencing poorer outcomes, and vice versa for better outcomes. Stakeholders also perceived that diagnosis of a mood disorder influences RTW outcomes. However, a number of systematic reviews do not conclusively support this finding [10, 11, 23].

Stakeholders also agreed that coping with pain was greatly to extremely influential on RTW. Workers who do not cope with their pain may catastrophize symptoms. Pain catastrophizing has been found to have a strong association with outcomes such as disability in a range of upper extremity conditions including trigger finger, DeQuervains tendinopathy, carpal tunnel syndrome, arthritis, lateral epicondylalgia, and distal radius fracture [47, 48]. We classified pain as psychological in this study based on the classification used by Waddell et al [38]; however, we acknowledge that pain also has important biological dimensions, and hence should be managed using a biopsychological approach.

Biological factors considered most influential were also dominated by pain, including pain severity and pain distribution over two or more bodily sites. Two or more musculoskeletal pain sites has also been found predictive of greater work disability duration following carpal tunnel surgery; however severity was not found to be prognostic [23].

Interestingly, there were factors that have been identified in prognostic factor studies for non-traumatic upper extremity diagnoses (including carpal tunnel release and rotator cuff surgery) that were not rated as being greatly to extremely influential on RTW by the majority of stakeholders. These include age, gender and workers'

Table 4 Logistic regression analysis including odds ratios for the likelihood of respondents selecting 'very to extremely influential' for a factor

Factor (dependent variable)	Respondent characteristic (Independent variable	B	SE	Wald	*p*	Odds ratio	95 % CI for odds ratio
Age	Age: 40–49 years	0.59	0.27	4.71	0.03	1.81	1.06–3.09
	Lawyer	1.79	0.65	7.49	0.01	5.98	1.66–21.53
	Insurer	0.91	0.28	10.41	0.001	2.49	1.43–4.33
	21–50 UE workers/mo[a]	−0.53	0.26	4.26	0.04	0.59	0.34–0.97
	Constant	−0.13	0.40	0.10	0.75	0.88	
Gender	Age: 60+ years	0.81	0.41	3.97	0.05	2.25	1.01–5.01
	Age: 30–39 years	1.0	0.51	4.03	0.05	2.80	1.03–7.66
	Lawyer	1.78	0.61	8.62	0.003	5.92	1.81–19.42
	Insurer	0.80	0.40	4.13	0.04	2.23	1.03–4.85
	Constant	−1.88	0.67	8.01	0.01	0.15	
Workers' compensation status	Male[a]	−0.49	0.19	6.64	0.01	0.61	0.42–0.89
	Age:3 0–39 years[a]	−0.90	0.34	6.98	0.01	0.41	0.21–0.73
	>50 UE workers/mo[a]	−0.68	0.27	6.35	0.01	0.51	0.30–0.86
	Constant	1.680	0.45	14.27	<0.001	5.36	
Worker's income	Insurer	0.67	0.28	5.71	0.02	1.95	1.13–3.37
	Constant	−0.12	0.40	0.09	0.76	0.89	
Worker is the primary breadwinner	≤5 years experience[a]	−0.65	0.31	4.45	0.04	0.52	0.29–0.96
	Constant	1.32	0.44	9.14	0.003	3.75	
Worker's education level	Male[a]	−0.38	0.17	5.15	0.02	0.68	0.49–0.95
	Insurer[a]	−0.05	0.28	3.93	0.05	0.58	0.33–0.99
	Constant	0.11	0.39	0.07	0.79	1.11	
Hand dominance	Male	0.46	0.18	6.63	0.01	1.58	1.12–2.23
	Lawyer	1.36	0.54	6.36	0.01	3.88	1.35–11.14
	>50 UE workers/mo[a]	−0.65	0.28	5.43	0.02	0.52	0.30–0.90
	Externally managed WC fund	0.34	0.17	4.04	0.05	1.41	1.01–1.72
	Constant	−1.41	0.42	11.33	0.001	0.24	
Worker's upper extremity diagnosis	>5 UE workers/mo	0.79	0.27	8.41	0.004	2.19	1.29–3.74
	Externally managed WC fund	0.38	0.17	4.97	0.03	1.46	1.05–2.04
	Constant	−0.15	0.41	0.01	0.97	0.99	
Worker's ability to cope with injury	>5 UE workers/mo	1.44	0.71	4.17	0.04	4.21	1.06–16.78
	1–25 % WC workers/mo[a]	−4.29	1.78	5.80	0.02	0.01	0.00–0.45
	>10 years experience[a]	−1.50	0.71	4.42	0.04	0.22	0.06–0.90
	Constant	3.51	1.00	12.40	<0.001	33.29	
Worker has a diagnosis of a mood disorder, e.g., anxiety, depression	51–75 % WC/mo[a]	−0.79	0.31	6.34	0.01	0.46	0.25–0.84
	Constant	2.70	0.61	19.96	<0.001	14.90	
Worker has family support	Male	0.42	0.19	4.58	0.03	1.51	1.04–2.21
	>50 UE workers /mo[a]	−0.65	0.31	4.45	0.04	0.52	0.29–0.96
	51–75 % WC /mo[a]	−0.59	0.25	5.52	0.02	0.55	0.34–0.91
	Constant	2.29	0.49	21.65	<0.001	9.86	
Worker has other comorbidities	Male	0.36	0.17	4.47	0.03	1.43	1.03–1.99
	Insurer	0.68	0.31	4.94	0.03	1.97	1.08–3.58
	>75 % WC/mo[a]	−0.57	0.23	5.98	0.01	0.56	0.36–0.89
	Constant	0.50	0.41	1.54	0.22	1.65	
Worker's cardiovascular fitness	Male	0.39	0.19	4.34	0.04	1.47	1.02–2.12
	<5 UE workers/mo[a]	−0.64	0.29	4.86	0.03	0.53	0.30–0.93
	Constant	−0.72	0.43	2.81	0.10	0.46	
Worker has alcohol abuse problem	Age: 60 + years	0.63	0.28	5.27	0.02	1.88	1.10–3.23
	Constant	0.69	0.42	2.71	0.1	1.99	

Table 4 continued

Factor (dependent variable)	Respondent characteristic (Independent variable	B	SE	Wald	*p*	Odds ratio	95 % CI for odds ratio
Worker is exposed to upper extremity vibration at work	Male	0.59	0.18	10.82	0.001	1.80	1.27–2.55
	Age: 40–49 years	0.63	0.31	4.17	0.04	1.87	1.03–3.42
	Lawyer	1.90	0.87	4.79	0.03	6.67	1.22–36.53
	Constant	0.62	0.43	2.13	0.15	1.86	
Worker is exposed to heavy lifting at work	Male	0.70	0.21	10.57	0.001	2.00	1.32–3.04
	>10 years experience[a]	−0.97	0.41	5.69	0.02	0.38	0.17–0.84
	Constant	1.38	0.55	6.32	0.01	3.98	
Worker is exposed to upper extremity repetition at work	Male	0.89	0.22	16.90	<0.001	2.42	1.59–3.69
	Age: 40–49 years	1.26	0.49	6.86	0.01	3.52	1.37–9.03
	1–25 % WC/m[a]	−3.21	1.56	4.23	0.04	0.04	0.002–0.86
	Constant	1.16	0.54	4.58	0.03	3.18	
Job control	Employer[a]	−0.92	0.35	6.84	0.01	0.40	0.20–0.79
	Constant	0.74	0.45	2.68	0.10	2.10	
Availability of alternative tasks at work	Male	0.58	0.24	6.13	0.01	1.79	1.13–2.84
	Constant	1.20	0.56	4.68	0.03	3.33	
Job modification available	Male	0.66	0.24	7.52	0.01	1.93	1.21–3.08
	Age: 40–49 years	1.09	0.45	5.86	0.02	2.99	1.23–7.24
	26–50 WC/mo[a]	−0.60	0.30	3.93	0.05	0.55	0.31–0.99
	>75 % WC/mo[a]	−0.89	0.34	6.93	0.01	0.41	0.21–0.80
	Constant	1.16	0.57	4.13	0.04	3.19	
Employer's willingness to modify the job	26–50 % WC/mo[a]	−0.90	0.37	6.03	0.01	0.41	0.20–0.83
Constant		2.87	0.69	17.58	<0.001	17.65	
Workplace's RTW policies and procedures	Age: 50–59 years	0.69	0.24	8.28	0.004	1.99	1.25–3.18
	Age: 60+ years	0.99	0.29	12.11	0.001	2.70	1.54–4.73
	Age: 30–39 years	1.02	0.38	7.38	0.01	2.79	1.33–5.83
	<5 UE workers/mo[a]	−0.65	0.27	5.68	0.02	0.52	0.30–0.89
	≤5 years experience[a]	−0.71	0.30	5.49	0.02	0.49	0.27–0.89
	Constant	0.95	0.43	4.76	0.03	2.58	
Worker's job satisfaction	1–25 % WC/mo[a]	−3.05	1.32	5.335	0.02	0.05	0.004–0.63
	>10 years experience[a]	−1.12	0.393	8.115	0.004	0.33	0.15–0.71
	Constant	3.07	0.647	22.509	<0.001	21.53	
Supportive employer	Male	0.59	0.28	4.33	0.04	1.81	1.035–3.15
	1–25 % WC/mo[a]	−2.90	1.45	4.02	0.05	0.06	0.003–0.94
	51–75 % WC/mo[a]	−0.89	0.42	4.41	0.05	0.41	0.18–0.94
	Constant	2.84	0.71	16.01	<0.001	17.02	
Supportive colleagues	Male	0.43	0.20	4.54	0.03	1.53	1.04–2.26
	Age: 60+ years	0.68	0.33	4.21	0.04	1.98	1.03–3.79
	Age: 30–39 years	0.92	0.45	4.15	0.04	2.51	1.04–6.07
	1–25 % WC/mo[a]	−3.69	1.42	6.81	0.01	0.03	0.002–0.40
	Constant	1.12	0.48	5.55	0.02	3.07	
Worker's RTW self-efficacy	1–25 % WC/mo[a]	−3.00	1.38	4.74	0.03	0.05	0.003–0.74
	51–75 % WC/mo[a]	−1.01	0.44	5.35	0.02	0.36	0.16–0.86
	Constant	2.85	0.76	14.02	<0.001	17.33	
Worker has suitable duties plan on RTW	Age: 60+ years	0.63	0.30	4.42	0.04	1.87	1.04–3.35
	Insurer	1.10	0.38	8.22	0.004	3.01	1.42–6.38
	Externally managed WC	0.41	0.19	4.95	0.03	1.52	1.05–2.20
	Constant	0.06	0.46	0.02	0.90	1.06	

Table 4 continued

Factor (dependent variable)	Respondent characteristic (Independent variable	B	SE	Wald	*p*	Odds ratio	95 % CI for odds ratio
Workplace has RTW coordinator	Age: 60+ years	0.71	0.27	7.19	0.01	2.04	1.21–3.44
	Insurer	1.04	0.30	11.80	0.001	2.82	1.56–5.10
	>50 UE workers/mo[a]	−0.77	0.27	8.00	0.01	0.46	0.27–0.79
	≤5 years experience[a]	−0.84	0.29	8.65	0.003	0.43	0.25–0.76
	Constant	0.14	0.41	0.12	0.73	1.15	
Worker has had a pre-employment medical examination	>10 years experience[a]	−0.84	0.38	4.96	0.03	0.43	0.21–0.90
	≤5 years experience[a]	−0.96	0.39	6.01	0.01	0.38	0.18–0.83
	Constant	−1.41	0.58	5.86	0.02	0.24	
Worker's occupation	Age: 30–39 years	0.81	0.40	4.20	0.04	2.25	1.04–4.87
	Constant	0.95	0.45	4.461	0.04	2.59	
Worker is exposed to frequent upper extremity twisting/bending at work	Male	0.51	0.19	7.37	0.01	1.66	1.15–2.40
	Age: 40–49 years	0.88	0.35	6.32	0.01	2.40	1.21–4.76
	Age: 60+ years	0.65	0.28	5.53	0.02	1.92	1.12–3.31
	Age: 30–39 years	0.94	0.37	6.46	0.01	2.56	1.24–5.28
	Employer	2.25	1.12	4.00	0.05	9.44	1.05–85.13
	≤5 years experience[a]	−0.80	0.32	6.35	0.01	0.45	0.24–0.84
	Constant	0.68	0.45	2.27	0.13	1.97	
Worker is claiming any type of compensation	Male[a]	−0.74	0.19	15.09	<0.001	0.48	0.33–0.70
	Employer	0.93	0.44	4.54	0.03	2.54	1.08–5.98
	Constant	2.06	0.44	21.75	<0.001	7.84	
Worker has legal representation	Male[a]	−0.42	0.20	4.25	0.04	0.66	0.45–0.98
	Lawyer[a]	−1.36	0.51	7.05	0.01	0.26	0.09–0.7
	Externally managed WC fund[a]	−0.46	0.19	5.82	0.02	0.63	0.44–0.92
	Constant	2.46	0.48	26.60	<0.001	11.66	
Doctor's recommendation for RTW	Male	0.56	0.19	8.55	0.003	1.75	1.20–2.54
	Insurer	0.94	0.41	5.16	0.02	2.55	1.14–5.71
	21–50 UE workers/mo[a]	−0.81	0.31	6.98	0.01	0.45	0.24–0.81
	>50 UL workers/mo[a]	−0.91	0.29	9.74	0.002	0.40	0.23–0.71
	1–25 % WC/mo[a]	−2.99	1.38	4.72	0.03	0.05	0.003–0.74
	Constant	1.47	0.48	9.54	0.002	4.35	

Only dependent variables with significant independent variable associations are reported. All other dependent variables can be assumed to have no significant respondent related factors contributing to the selection of a factor

Significant variables contributing to the model with $p < 0.05$. All independent variables not reported can be assumed to be not significant. Compared to Age—10 to 19 yrs; Occupation – HCP; 6–10 UE workers/month

[a] −ve B values indicate less likely to select very to extremely influential

UE upper extremity, *WC* workers' compensation, *mo* month

compensation status [4, 49]. These factors are not readily amenable to interventions and thus perhaps were not front-of-mind for the respondents when confronted with other factors that are modifiable, and have also been found to be associated with delays in RTW. The good news is that the majority of the factors that stakeholders rated as being greatly to extremely influential are modifiable (e.g., pain severity and coping, worker's self-efficacy and expectations, job accommodation availability and employers willingness to accommodate changes). Thus these modifiable factors are generally amenable to either clinical (e.g., pain management, cognitive behavioral therapies) and RTW interventions (e.g., workplace based interventions, stakeholder interventions).

Differences in Agreement Between Stakeholder Groups

There were differences between stakeholder groups on 19 (36.5 %) factors. The strongest disagreements included:

age; gender; obesity; doctor's recommendation for RTW; and the presence of a RTW coordinator. These differences may arise from the unique standpoint each stakeholder has in the RTW process [50]. Ideally, stakeholders work together and communicate regularly to facilitate a successful RTW. However, in reality stakeholders often have their own motivations and goals based on their perceived role in the RTW process [6]. For example, more employers considered the presence of a RTW coordinator as influential compared to the other stakeholder groups, likely due to their familiarity and appreciation of the unique role RTW coordinators play in the RTW process assisting injured workers back to work.

The professional background of the stakeholder may mean they adopt different frameworks to conceptualize both the injury and RTW outcomes [51]. These differences may lead stakeholders to place more importance on those factors they perceive to have a greater influence on RTW. This has been thought to result in tension and conflict [7]. Therefore, it is not surprising that the stakeholders disagreed on some of these factors. However, the percentage of factors for which disagreements existed (36.5 %) is perplexing. The reasons for this warrant further exploration, as they may interfere with the success of RTW interventions. Decreasing sources of miscommunication and misinformation whilst increasing stakeholder's awareness of their professional paradigms and motivations is purported to improve RTW outcomes [6].

It is important to consider that it might also be unrealistic for stakeholders to agree on all factors that they believe influence RTW. The evidence supports collaboration and effective communication as two key components of successful RTW interventions [52]. Therefore, discussing discordant views of goals for RTW, perceived barriers and facilitating factors could theoretically improve RTW, regardless of the divergent perspectives. Baril et al [22] suggested that key ingredients influencing either the success or failure of RTW interventions appear to be trust and communication between stakeholders, which might be used to discuss differing perspectives and to develop interventions.

Respondent-Related variables and their Association with the Rating of Factors

For 34 (68 %) of the factors that stakeholders rated as being 'greatly to extremely' influential on RTW, there was a higher likelihood of a respondent rating a factor based on their demographic and occupation-related variables. It is more likely that those who have greater experience in working with workers with upper extremity conditions or higher number of workers' compensation claimants may respond differently to those who have less experience or see fewer workers' compensation workers. This was the case for the following respondent-related variables: workers' compensation status, hand dominance, worker having other comorbidities, job modification availability, supportive employer, the workplace having a RTW coordinator and doctor's recommendation for RTW. Workers who are claiming through workers' compensation and those that are privately insured have been found to have different RTW experiences [53] and stakeholders' perspectives reflected this. This may also explain why those from an externally managed fund were more likely to rate 'the worker has a suitable duties plan in place when returning to work'. Similarly, stakeholders may respond differently depending on their role in the RTW process. For example, lawyers were less likely to select 'the worker has legal representation' as a factor influencing RTW outcomes. Employers were more likely to rate 'the worker is claiming any type of compensation' and 'worker is exposed to frequent upper extremity twisting at work' and insurers were more likely to select 'worker has a suitable duties program on RTW', 'workplace has a RTW coordinator' and 'worker's pre-injury income' as influential for RTW.

Methodological Considerations and Implications for Future Research

Strengths of this study included the large sample size with broad representation across jurisdictions, age and sex of the respondents. Also, respondents were mostly experienced in their role and dealt with a considerable number of upper extremity cases on a monthly basis. One limitation of this study was that we were unable to obtain an equal number of participants from each stakeholder group. There was a predominance of healthcare providers compared to lawyers, insurer or employer representatives. Although equal representation across groups would be ideal, this is most likely a reflection of the relative proportion of stakeholders who actually manage workers with upper extremity conditions in Australia.

Factors garnered for this study were identified from various systematic reviews of the literature. However, this may not constitute an exhaustive list of all factors that may influence RTW. Likewise, due to the nature of this study, the factors identified by stakeholders cannot be considered to be prognostic for RTW. This study also highlighted the complexity of categorizing many of the factors included in this study using a specific model (i.e., biopsychosocial model). Some of the factors (e.g., coping with the pain) may involve a psychological and biological component, and job satisfaction may involve psychological and social elements; however categories for the factors were determined by consensus by all authors based on the conceptualization used by Waddell et al [38]. The factors that have a likely interaction between domains are identified in Table 2. It is also important to acknowledge that interactions between the

biopsychosocial dimensions and their relative importance is different for each worker and setting and may change over time. What this study does contribute is an insight into the perspectives of stakeholders who regularly deal with injured workers with upper extremity conditions. It provides a list of factors with prognostic potential that warrant further investigation in longitudinal studies. As there is a dearth of literature investigating the prognostic factors for RTW following surgery for common upper extremity conditions, high quality cohort studies are urgently needed.

Conclusion

In our study of Australian stakeholders dealing with injured workers, more than 75 % of stakeholders agreed on 23 factors. These factors were mostly related to the workplace or were psychological. These factors were generally modifiable and amenable to intervention. There was less consensus (<75 %) on 27 factors. There were differences between stakeholder groups for 19 (36.5 %) of the factors. Moreover, a number of respondent-related variables were associated with the likelihood of rating 34 of the factors. The primary recommendation from this study is that future prognostic studies should focus on establishing the value of the identified modifiable factors on RTW. This may in turn improve interventions aimed to facilitate RTW.

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Compliance with Ethical Standards

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