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Health-care providers' perspectives on factors influencing return-to-work after surgery for nontraumatic conditions of the upper extremity

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ABSTRACT

Study Design: This study is a descriptive survey.**Introduction:** Health care providers (HCPs) are key stakeholders who facilitate workers' return to work (RTW) following upper extremity surgery. Hand therapists play a major role in this process, yet we do not know if and/or how their perspectives differ from other HCPs.**Purpose of the Study:** This study examined HCPs' opinion on factors that influence RTW after surgery for nontraumatic upper extremity conditions and whether HCPs from different disciplines differed in their opinion.**Methods:** HCPs (occupational therapists, physiotherapists, hand therapists, exercise physiologists, psychologists, surgeons, and general practitioners) completed a survey rating 50 factors on a worker's ability to RTW. Each factor was scored using a 5-point Likert scale from "not" to "extremely" influential, which was later dichotomised. Agreement was indicated at 75%. The level of disagreement between disciplines was examined. **Results:** Respondents ($n = 787$) identified 20 factors being influential on RTW. They are (in order from highest to lowest) poor pain coping (the highest, >85% of respondents), postoperative psychological state, RTW self-efficacy, employer/supervisor's support, employer's unwillingness for job modification, recovery expectations, job satisfaction, suitable duties availability, whether the job can be modified, and mood disorder diagnosis. There was agreement that two factors do not influence RTW, gender, and preemployment medical assessment. There was disagreement ($P < .05$) between HCP disciplines on six factors (obesity, comorbidities, doctors' RTW recommendation, diagnosis, fitness, income). There were no consistent patterns with respect to which professions disagreed across all six factors. Hand therapists differed from the other disciplines for three of the factors including diagnosis, comorbidities, and doctor's recommendation for RTW.**Discussion:** The factors that stakeholders agreed as having the greatest influence were mainly related to the worker (pain and psychological factors) and the workplace and are amenable to RTW interventions. **Conclusion:** Interventions facilitating RTW and future research should consider the factors identified by HCPs in this study.

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Introduction

Disability associated with nontraumatic work-related musculoskeletal conditions of the upper extremity (UE) is a significant and costly societal problem.^{1,2} Injuries to the wrist and hand account for 38% of work-related injury resulting in hospitalization and time incapacitated from work.³ Surgery is frequently offered to workers who have more severe symptoms or do not respond adequately to conservative management. Despite the success of surgery for certain conditions, such as carpal tunnel syndrome and rotator cuff pathology, work disability often persists.^{4,5} This results in a burden on health-care services and increasing associated costs to a number of key stakeholders, including workers, employers, and insurers.¹ Importantly, there is evidence that work disability affects workers' physical and psychological health, resulting in lower quality of life and well-being.^{6,7}

The literature has identified many factors influencing the ability for a worker to return to work (RTW).^{8–11} These variables can include worker-related (eg, demographic, biological, psychological), workplace, and societal factors. The biopsychosocial model is often used to categorize prognostic variables for RTW.¹² However, few studies have focused on prognosis after a surgery of the UE, with most being retrospective or cross-sectional in nature and few being of high quality.¹¹ In addition, few variables that have been identified as being prognostic for other diagnostic groups, such as low back pain, have not yet been studied in UE conditions.^{11,13}

Stakeholders are individuals who have a direct interest in the RTW process.¹⁴ Workers often receive sickness and medical benefits through either a workers' compensation or a national social insurance scheme. Regardless of the jurisdiction, various stakeholders are involved in the RTW process with a common goal of returning the injured worker back to work.¹⁵ Stakeholders can be instrumental in identifying factors that may delay a worker's RTW and cause unnecessary work disability.⁶ Health-care providers (HCPs), such as hand therapists, are important stakeholders who not only provide clinical and RTW interventions but are also instrumental in the decision-making process on legitimization of work-relatedness and readiness to RTW and in providing guidelines on a worker's functional capacity and prescription of suitable duties.^{16–18} Hand therapists are essential members of the multidisciplinary team and hence are almost always included in both the development and implementation of RTW interventions. Understanding which factors HCPs perceive as being influential in a worker's ability to RTW will assist in designing research studies to explore prognostic variables to RTW and to develop successful assessment tools and interventions designed to promote early RTW and prevent longer term (work) disability.

Purpose of the study

The purpose of this study was to examine how perspectives on the factors that influence RTW after an UE surgery might differ (or be similar) between different health-care professions. Thus, the aims of this study were as follows: (1) to establish HCPs' perspective on factors influencing RTW after a surgery for nontraumatic musculoskeletal conditions of the UE, (2) to examine the level of agreement between different HCP disciplines, and (3) to consider the clinical and research implications for these differences (and similarities).

Method

For this observational cross-sectional study, a questionnaire was distributed either electronically (www.surveymonkey.net) via key gatekeeper organizations (for the list of gatekeeper organizations,

see *Acknowledgments*) or by hard copy at relevant stakeholder events across Australia. Appropriate ethical approvals were obtained from the investigators' institution (2012SHRS_OT007). This article outlines the findings of HCPs from a large cross-sectional study that also determined perspectives on RTW among insurers, employers, and lawyers.¹⁹

Development of the questionnaire content

The questionnaire was divided into sections for ease of completion. Each section was designed to obtain information on stakeholders involved in the RTW process for workers with UE conditions and to answer specific research questions. The first section of the survey obtained demographic and professional information of the participants. Another section aimed to gain stakeholders' perspectives on 50 factors they believed influenced RTW after a surgery for nontraumatic UE conditions. The selected factors were extracted from systematic reviews on prognostic factors for RTW.^{8–11,20–26} Participants were provided with examples of the types of surgery and conditions, such as carpal tunnel syndrome and tendinopathies. Participants rated each factor on a five-point Likert scale, ranging from "not at all influential" to "extremely influential", with a sixth option for "no opinion". Survey items were randomized for the electronic questionnaire to reduce bias. Respondents were able to revise their answers using the "back" function in SurveyMonkey. Site visitors were determined by IP address to avoid duplicate entries from the same person.

The survey was piloted before distribution to examine the comprehensibility and face validity of each question and factor included in Section 2. Participants of the pilot round were stakeholders with various roles in the RTW process and managing workers with UE conditions over 10 years. Modifications were made to the survey on content and format. After this, the questionnaire was distributed to another 10 participants to establish reliability between the electronic and hard copy. They completed the questionnaire with a minimum of 24 h in between. Weighted kappas were calculated for each factor in its original (5-point scale) format and kappa in its dichotomized state. Weighted kappa and kappa results for the factors of the questionnaire were all above 0.74. These findings are in agreement with a recent systematic review, which showed that paper-based and Web-based questionnaires are reliable when used interchangeably.²⁷

Recruitment procedure

HCPs who dealt with injured workers as part of their occupational role were recruited for this study. Disciplines included occupational therapists, physiotherapists, hand therapists, psychologists, exercise physiologists, surgeons, and general practitioners. Key gatekeeper organizations distributed an open survey via email and/or in the organization's newsletter between August 2013 and January 2014. The survey was also disseminated by the 'RTW Matters' online newsletter (www.RTWmatters.org), which is distributed nationally to HCPs, employer representatives, and insurer claims advisors and case managers. We also engaged in key stakeholder events to distribute and advertise the survey. Completion of the survey was voluntary. Participants were provided with a generic link to the electronic survey or provided with a hard copy to complete. We used a "snow-ball" sampling method by inviting participants to forward the Web-based link to other HCPs who dealt with workers with UE conditions. This technique was used as it is not mandatory in Australia to be enrolled with the key professional organizations who disseminated the survey on our behalf. A lottery incentive of a \$200 gift card was used to encourage participation.

Setting

The study was conducted in Australia. Australia has systems of both publicly and privately funded health-care and insurance arrangements for injured workers, public liability insurance, and motor vehicle accidents.²⁸ Workers' compensation is provided to eligible workers who are employed at the time of the injury and have a work-related injury (Fig. 1). They are entitled to percentage income replacement during the recovery period, insurer-approved medical and rehabilitation coverage, RTW suitable duties plans, and lump sum compensation for significant permanent impairment. Financial compensation is based on the worker's lost income at the time of the injury or claim. Workers' compensation insurance is regulated within each state or territory of Australia. Large employers are able to self-insure in each state but are still regulated by the state's government authority.

Statistical analysis

Hard copy responses were later entered into SurveyMonkey, and data were quality-checked by a second independent person external to the study. Data were exported from SurveyMonkey to SPSS (version 22; IBM Corp) for analysis. Descriptive statistics were used to profile the participants. The data from the Likert scale responses were dichotomized into two categories. The first category contained "1—not at all influential", "2—slightly influential", and "3—somewhat influential". The second category contained the "4—very influential" and "5—extremely influential". The response option "no opinion" was not counted in the analysis. Frequency data were tabulated for the

categorical values. All analyses were performed using $P < .05$ as the level of significance. For the overall sample, we considered that there was an agreement if at least 75% of all stakeholders (regardless of discipline) indicated that the factor belonged in one of the dichotomized categories. This cutoff has been used previously.²⁹ We also tested the proportion of HCPs by discipline, who had selected either of the dichotomized categories, using the χ^2 statistic or Fisher's exact test (for factors which had less than 5 participants per cell in a contingency table) to determine differences between the groups. Chi-square post hoc analyses were conducted based on the adjusted standardized residuals to ascertain which disciplines were significantly different (using a Bonferroni adjusted P -value set at $P = .002$).

Results

Participant characteristics

A total of 787 participants completed the questionnaire (electronic [$n = 739$]; hard copy [$n = 48$]). Table 1 displays the characteristics of the participants. The majority of the participants were hand therapists (25.4%), women (65.4%), aged 30 to 49 years (55.3%), and HCPs in primary care. The majority (59%) indicated that they had more than 10 years' experience in their field.

Agreement (>75%) on factors influencing RTW

The results of the 50 factors (Online Appendix) and their distribution in their dichotomized states are presented in Figure 2.

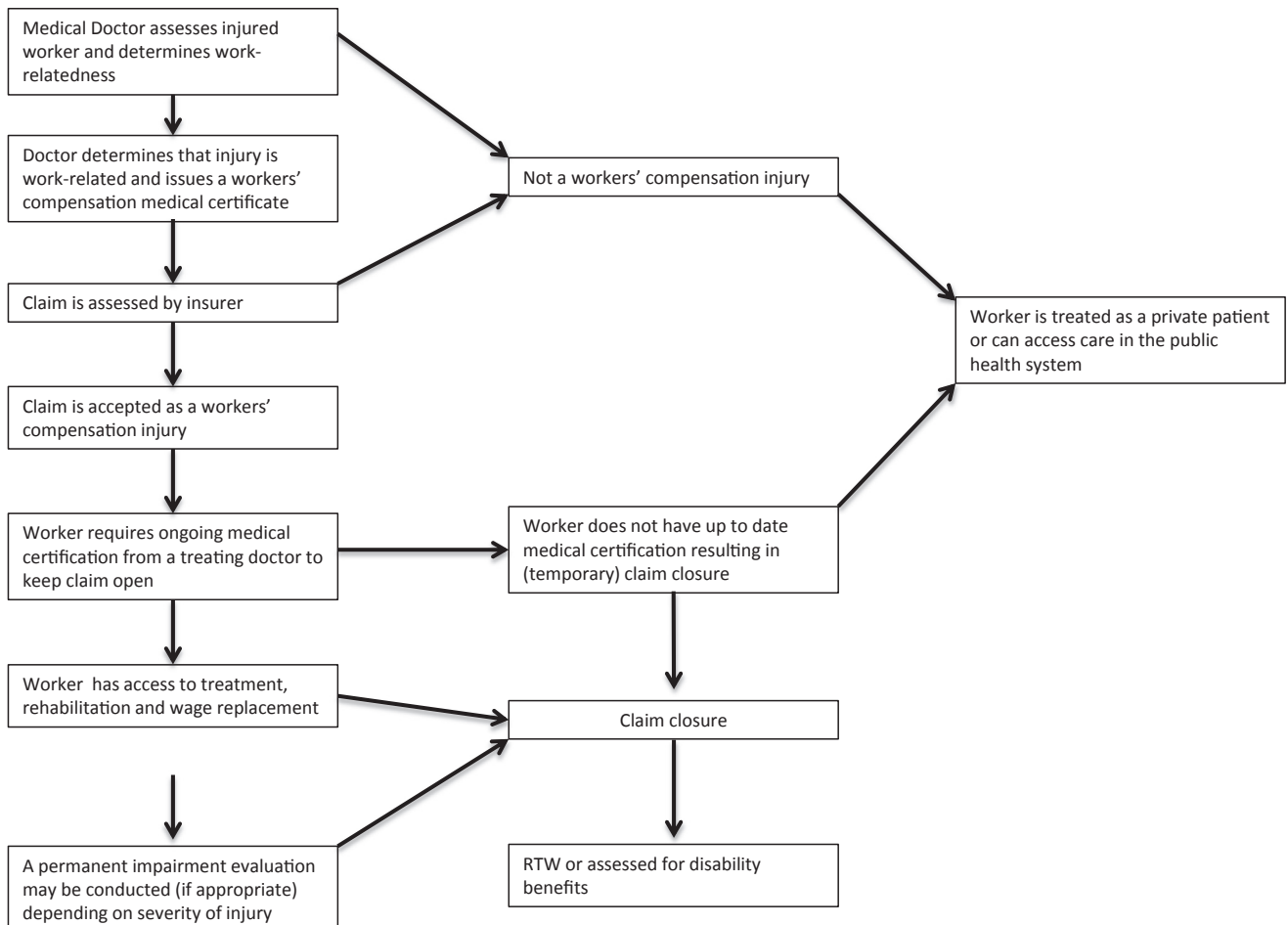


Fig. 1. Workers' compensation process in Australia. RTW = return to work.

Table 1
Participant demographic profile (N = 787)

Characteristics	n (%)
Gender	
Male	272 (34.6)
Female	515 (65.4)
Age group (years)	
21–29	142 (18)
30–39	242 (30.8)
40–49	193 (24.5)
50–59	130 (16.5)
60 or older	80 (10.2)
Scope of practice	
Primary care	427 (54.3)
Secondary care	209 (26.6)
Both primary and secondary care	130 (16.5)
Other (eg, management)	21 (2.7)
Years of experience	
Less than 1 year	29 (3.7)
1–5 years	133 (16.9)
6–10 years	161 (20.5)
Greater than 10 years	464 (59)
Profession	
Hand therapist	200 (25.4)
Physiotherapist	178 (22.6)
Occupational therapist	138 (17.6)
Surgeon	91 (11.6)
General practitioner/occupational physician	59 (7.5)
Exercise physiologist	58 (7.4)
Psychologist/rehabilitation counselor	28 (3.5)
Others (nurse, social worker)	36 (4.6)
State ^a	
New South Wales	324
Queensland	213
Victoria	113
Western Australia	59
South Australia	50
Australian Capital Territory	28
Tasmania	14
Northern territory	10

^a Thirty-six workers nominated working across two workers' compensation jurisdictions.

Twenty factors were rated by more than 75% of the HCPs as “greatly to extremely” influencing RTW. These included four biological factors: (1) the worker has difficulty coping with the pain (95%); (2) pain intensity after the surgery (eg, the higher the pain intensity is, the more it influences RTW) (86%); (3) two or more musculoskeletal pain sites (76%); and (4) poor overall preoperative function (76%). Five psychological factors were rated by >75% of HCPs as being “greatly to extremely” influential: (1) postoperative psychological status of the worker (eg, emotional and mental state, someone who either displays psychological manifestations with or without a diagnosed mental illness (92%); (2) worker's RTW self-efficacy (92%); (3) worker's recovery expectations (89%); (4) diagnosis of a mood disorder (eg, depression or anxiety disorder; 87%); and (5) psychological status of the worker before surgery (83%). Ten social factors related to the workplace were also selected: (1) having a supportive employer or supervisor (91%); (2) employers' willingness to modify the job (91%); (3) job satisfaction (88%); (4) availability of suitable duties (88%); (5) whether the job can be modified (87%); (6) workers perception that the job can be modified (84%); (7) exposure to UE repetition (80%); (8) heavy lifting (79%); (9) job control (78%); and (10) supportive work colleagues (75%). One other social factor outside the workplace was selected, namely supportive family (76%). All these factors are potentially modifiable and amenable to intervention.

The factors that were rated by the smallest proportion of HCPs as being “not to somewhat” influential on RTW were gender (92%) and whether the worker had a preemployment medical condition (85%).

Nonconsensus (<75%) on factors influencing RTW

There was no consensus on 28 (56%) of the factors (Fig. 2).

Differences between HCP disciplines

Only six factors showed statistically significant discrepancies in rating between different professions: (1) annual income; (2) UE diagnosis; (3) presence of a comorbidity; (4) obesity; (5) presurgery cardiovascular fitness; and (6) doctor's recommendation for duration of work absence. There were no consistent patterns with respect to which professions disagreed across these factors. Hand therapists differed from the other disciplines for three of these factors: (1) UE diagnosis, (2) obesity, and (3) doctor's recommendation for RTW. For annual income and obesity, professions appeared to be divided as either the majority believing the factor was “very to extremely influential” or “not influential.” However, for obesity, post hoc analyses revealed that the group that was significantly different from the other disciplines was psychologists in which 57% perceived this factor as being “very to extremely influential” compared with 34% of occupational therapists and 33% of surgeons. For annual income, post hoc analyses revealed that the 69% of hand therapists who nominated this item as being “not to somewhat influential” were significantly different from the other disciplines who had higher percentages of HCPs nominating this factor as being “very to extremely influential.” For workers' diagnosis, all professions believed this was “very to extremely influential,” except for psychologists. Sixty-two percent of psychologists believed that diagnosis was only “somewhat to not influential” on RTW. For presence of a comorbidity, all professions except for surgeons (32%) and hand therapists (48%) believed this factor was “very to extremely influential.” For worker's presurgery cardiovascular fitness, psychologists and exercise physiologists were the only groups that had the majority (68% and 64%, respectively) indicating that this was “very to extremely influential”; however, only physiotherapists were significantly different in the post hoc analyses. Post hoc analyses also revealed that there were significant differences also for physiotherapists (with only 58% identifying this factor as being “very to extremely influential”) and surgeons (who had the highest percentage at 87% believing this factor was “very to extremely influential”). For doctor's RTW recommendation, all professions except surgeons (63%) felt that this factor was “very to extremely influential.” Hand therapists also significantly differed but only because a lower percentage nominated this as being “very to extremely influential” (65%) compared with the other five disciplines (74%–83%). Data are summarized in Table 2.

Discussion

This study identified factors that HCPs believe influence RTW after a surgery for nontraumatic UE conditions. Stakeholders agreed on 20 (40%) factors that they perceived greatly influenced RTW and two (4%) factors that were not to somewhat influential on RTW. No consensus was reached on 58% of factors. Disagreements between different disciplines were found for 12% of factors including worker's annual income, obesity, worker's UE diagnosis, presurgery cardiovascular fitness, and doctor's RTW recommendation. As there is a dearth of studies examining stakeholders' perspectives of factors influencing RTW, we will discuss our findings with respect to the existing literature on prognostic factors for RTW.

Agreement (>75%) on factors influencing RTW

Three factors that were rated as influential by more than 75% of HCPs were related to pain. The selection of these factors is particularly interesting as there is no consistent evidence in the literature

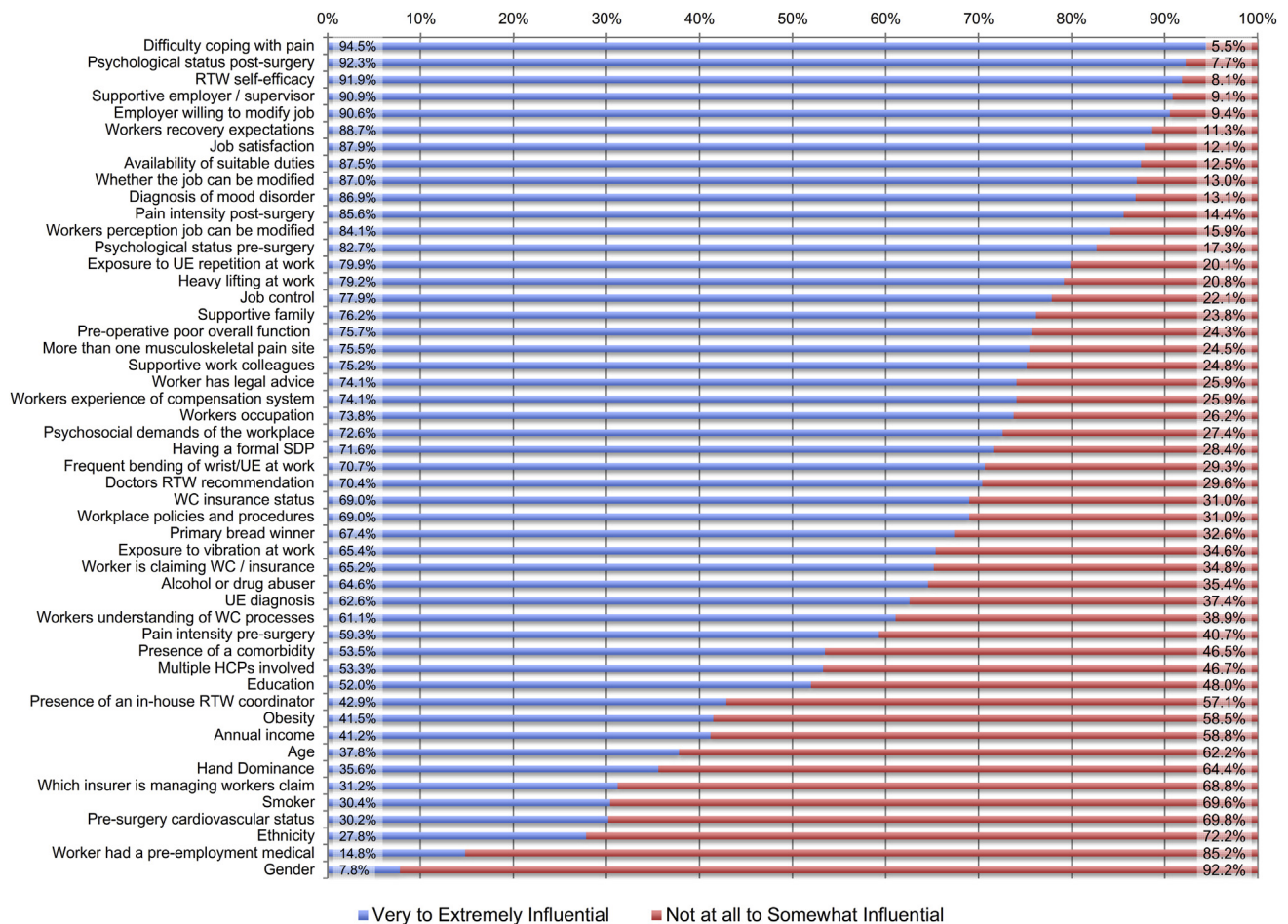


Fig. 2. Stakeholders' rating of factors influencing return to work. RTW = return to work; UE = upper extremity; HCP = health-care provider; SDP = suitable duties program; WC = workers' compensation.

to either support or refute these factors as being influential. Pain intensity was found to not have a strong association with RTW timeframes for both nontraumatic and traumatic UE conditions.^{10,11} HCPs may have selected pain intensity as this is the focus of many clinical and psychological treatments in their practice; therefore, they may be more likely to see workers experiencing high levels of pain who have difficulty returning to work. An American study found that hand surgeons were more likely to certify a worker off work if they reported high levels of pain.³⁰ Little research has focused on the association of coping with pain after a UE surgery with work-related outcomes. However, coping strategies have been shown to have a positive association with overall health and decreased sickness absence in patients with general health problems.³¹ Although rated by 75% of respondents as being influential, there is conflicting evidence to support number of UE musculoskeletal pain sites influencing RTW.^{32,33}

Nearly 50% of the identified factors that were rated by more than 75% of HCPs were related to the workplace. Those ranked highest included supportive employer or supervisor, the employer's willingness to modify the job, job satisfaction, availability of suitable duties, and whether the job can be modified. The evidence is inconsistent when it comes to the supportiveness of the employers and their willingness to accommodate job modifications.³⁴ A systematic review found moderate evidence that early contact with an injured worker by the workplace can significantly reduce work disability duration.¹⁷ There is also evidence to suggest that job accommodation at work reduced

work disability duration across several diagnoses,¹⁷ including the UE.¹¹

HCPs identified six psychological variables that they perceived could influence RTW. A mood disorder diagnosis of either depression or anxiety has been found to be prognostic for RTW in several systematic reviews,^{9,19} including the one focused on carpal tunnel surgery.¹¹ Yet, psychological status before and after surgery has had mixed reports in the literature.^{9,20} Worker's RTW self-efficacy was also highly rated. RTW self-efficacy has been found to have a positive association with RTW after various musculoskeletal injuries including the UE.^{19,35} Furthermore, a Delphi study found that RTW self-efficacy was one of the most important factors that influences RTW after a surgery for nontraumatic UE disorders.¹³ Yet, a review on factors that influence RTW after a carpal tunnel surgery found few studies that reported self-efficacy as a factor reaching statistical significance.¹¹

Our findings also demonstrated a common perspective between HCPs that gender has little influence on RTW outcomes in patients with UE conditions, which is consistent with findings from a systematic review on carpal tunnel release.¹¹ The worker having a preemployment medical evaluation to identify preemployment health and work capacity was also rated by the majority of stakeholders as not being very influential on RTW. Although its importance in injury prevention has been surmised, it is yet to be studied as a prognostic variable to RTW.³⁶

Overall, the results suggest that HCPs are cognizant of the biopsychosocial factors influencing RTW. This may be due to various Australian workers' compensation insurers advocating for HCPs to

Table 2
Factors rated differently between professions

Factor	Overview of disagreements ^a	Statistics
Annual income	Very to extremely influential: EP: 55% PSY: 55% SURG: 50% PT: 44% GP: 43% OT: 37% HT: 31% ^b	χ^2 : 15.44 DF: 7 N: 582 P: .017
Worker's upper limb diagnosis	Very to extremely influential: SURG: 72% ^b HT: 70% ^b EP: 64% OT: 60% PT: 55% GP: 54% PSY: 38% ^b	χ^2 : 16.74 DF: 7 N: 597 P: .010
Presence of a comorbidity	Very to extremely influential: PT: 68% ^b EP: 64% PSY: 59% OT: 55% GP: 51% HT: 48% ^b SURG: 32% ^b	χ^2 : 30.16 DF: 7 N: 594 P: <.001
Obesity	Very to extremely influential: PSY: 57% ^b EP: 52% PT: 52% GP: 43% HT: 35% OT: 34% ^b SURG: 33% ^b	χ^2 : 16.45 DF: 7 N: 576 P: .012
Worker's presurgery cardiovascular fitness	Not at all to somewhat influential: SURG: 87% ^b OT: 76% HT: 73% GP: 72% EP: 63% PT: 58% ^b PSY: 43% ^b	χ^2 : 29.1 DF: 7 N: 566 P: <.001
Doctor's RTW recommendation	Very to extremely influential: EP: 83% PSY: 77% PT: 76% GP: 74% HT: 65% SURG: 47% ^b	χ^2 : 28.9 DF: 7 N: 597 P: <.001

EP = exercise physiologist; PSY = psychologist/rehabilitation counselor; PT = physiotherapist; GP = general practitioner; OT = occupational therapist; HT = hand therapist; SURG = surgeon; RTW = return to work; DF = degrees of freedom.

^a Percentage of respondents who nominated that the factor was either "very to extremely influential" or "not at all to somewhat influential".

^b Discipline that was significantly different ($P < .002$) from the other disciplines through post hoc analysis.

consider this model in practice in their treatment guidelines^{37,38} and being supported by empirical evidence.¹² Previous research also suggests that HCPs are well placed to identify biopsychosocial barriers to RTW, and in fact, their own expectations of recovery are potentially associated with poorer outcomes.³⁹ It is also important to note that the majority of the 20 factors identified by more than 75% of HCPs as influential were modifiable and amenable to intervention. Perceived risk factors may be those that are being commonly remediated in their clinical practice or may remind them of a cluster of patients with similar presentations, therefore being front-of-mind.

Differences between HCP disciplines

HCPs disagreed on six of the fifty factors. There were no consistent patterns with respect to which professions disagreed

across these factors. There may be a number of reasons why disciplines do not agree on the factors including differences in their background training, their own experience in managing workers with UE injuries, and their own personal ideologies.

We found significant differences between hand therapists and the other disciplines for a workers' income influencing RTW. There is strong evidence that higher income workers with a traumatic hand injury are more likely to RTW sooner than their lower income counterparts.¹⁰ However, this finding has not been supported for nontraumatic UE conditions.¹¹ It may be likely that individuals receiving higher income have a greater discrepancy between their work-income and injury-compensation income, which may promote faster RTW. However, it could also be argued that lower wage earners need to return to work sooner, especially if their compensated income is not equitable to their preinjury earnings.

For worker's UE diagnosis, the highest level of disagreement was observed between psychologists who felt that diagnosis was not important and surgeons and hand therapists who perceived diagnosis to be very important. A potential reason for the discrepancy between psychologists and hand therapists and surgeons might be the difference in the focus of their clinical interactions and training. Surgeons and hand therapists work with these workers because of the UE diagnosis and the clinical findings that they assess in their day-to-day practice. This also concurs with evidence in the literature that some HCPs, such as medical professions and physical therapists, traditionally use medical or physical findings when making decisions about musculoskeletal conditions.⁴⁰

Disagreement was found for the presence of a comorbidity and obesity. Obesity is a comorbidity that has been associated with decreased physical activity and carpal tunnel syndrome.^{41,42} There is a strong association between conditions, such as depression and obesity.⁴³ People with mental health issues may be at greater risk of developing obesity, whereas obesity may also increase risk factors for depression.⁴³ This could explain why psychologists rated obesity as being influential as they are likely to be dealing with a relatively larger population of people with mental health issues. Exercise physiologists and physiotherapists are specialists in exercise interventions and physical activity education, which are mainstays of the management of obesity. Therefore, it may not be surprising that these HCPs rated obesity as being influential in RTW. However, it is important to note that despite the differences in HCP perspectives on this variable, the literature has not found either factor to be strongly prognostic for RTW.

Most HCPs, except for psychologists, agreed that presurgery cardiovascular fitness is not influential on RTW. Psychologists may place greater emphasis on the psychological and procedural aspects of RTW, with little experience with cardiovascular fitness training. However, again, this factor has not been found to be prognostic for RTW in the literature.¹¹

Overall, most HCP professions agreed that the doctor's recommendation influences time to RTW, except for the surgeons. Doctors are usually the first primary care providers providing advice after a surgery. Thus, it is natural that other HCPs (such as allied health) take reference from the doctor's recommendation for amount of work absence. A study by Ratzon et al found that a doctors' recommendation was the most influential factor for determining RTW.⁴⁴

Methodological considerations for this study

Owing to the privacy policies of the gatekeeper institutions and the snow-ball recruitment method, it is unknown precisely how many stakeholders the questionnaire was distributed to. Also, it is not mandatory for some HCPs to be affiliated with their professional associations in Australia. Therefore, it is also unknown how

many may have been affiliated with more than one association. In this instance, our sampling strategy may be considered a strength as it ensured wide dissemination and representation from all stakeholder groups across Australia. However, due to the unknown sampling population, some groups may be underrepresented, and this may have influenced the results.

One limitation was that we were unable to obtain an equal number of participants from each HCP discipline. There was a predominance of allied health professions, with fewer medical doctors who are the gatekeepers for entry into the Australian workers' compensation system. Also, not all disciplines involved in RTW were represented. Limited participation (<5) by nurses and social workers meant that they were not included in the analysis. Although representation of all disciplines would be ideal, the current sample is a reflection of the relative proportion of those disciplines that commonly manage workers with UE conditions. However, these groups were underrepresented in the sample, especially in certain Australian states, and this could have influenced the overall findings.

Clinical and research implications

This study contributes an insight into HCPs perceptions of factors influencing RTW. This information may be used to enhance RTW interventions and open a dialog regarding potential prognostic variables that warrant further investigation:

1. RTW interventions should consider the factors identified by health-care professionals in this study as being important in influencing RTW. Knowledge of how HCPs perceive factors influencing RTW may also facilitate improved multidisciplinary evaluation of RTW barriers and open discussions between HCP disciplines aimed at promoting RTW.
2. Important worker-related risk factors that should be considered in a clinical evaluation include (but are not limited to) pain, psychological state, self-efficacy and recovery expectations, job satisfaction, mood disorder diagnosis, pain intensity, workers' perceptions of RTW capacity, and accommodations.
3. Important workplace-related risk factors that should be considered in an RTW assessment include (but are not limited to) support provided by those in the workplace, availability of suitable duties, and willingness of the workplace to accommodate and explore physical job requirements.

Owing to the dearth of literature investigating prognostic factors for RTW after a surgery for UE conditions, there is an urgent need for further study in this field to answer the research question, What factors influence RTW outcomes after UE conditions? This should include methods such as a prognostic cohort examining the prognostic ability of these factors and time to RTW and the testing of RTW interventions based on the factors influencing RTW which are amenable to change.

Another important consideration is the cutoff used to determine a "delayed RTW" outcome. A Delphi study of experts conducted by the authors⁴⁵ found no consensus in the definition for RTW, and two-thirds of experts believed that time-based cutoffs to delineate a poor outcome should be avoided. Thus, a clear definition of what constitutes RTW in any scenario, clinically or based on research, is key for interpretation of the findings.

Conclusions

Our results found that HCPs agreed on 20 factors that greatly influence RTW after a surgery for nontraumatic UE conditions. These factors were modifiable and amenable to interventions. This

information adds to the existing literature as it may be used to enhance RTW interventions and open a common dialog regarding potential prognostic variables that HCPs frequently agree or disagree on. Owing to the nature of this study, the factors identified by stakeholders should not be regarded as prognostic factors for RTW. This study provides a list of factors that HCPs strongly believe to influence RTW and therefore warrant consideration in clinical practice when assessing barriers for RTW and in designing future studies on factors influencing RTW in this population of workers.

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Appendix

Supplementary Table 1
HCPs' rating of factors

Factor	1	2	3	4	5	Mean average ^a
	Not at all, %	Slightly, %	Somewhat, %	Very, %	Extremely, %	
Worker displays difficulty coping with pain/injury	0.33	0.33	4.78	30.48	64.09	4.58
Worker's RTW self-efficacy	0.33	0.50	7.35	32.72	59.10	4.50
Postoperative psychological status	0.50	0.33	6.79	33.61	58.77	4.50
Willingness of the employer to accommodate job modifications	0.33	0.50	8.51	34.89	55.76	4.45
Supportiveness of the employer or supervisor	0.33	0.67	8.03	35.79	55.18	4.45
Worker's job satisfaction	0.34	0.84	10.79	35.08	52.95	4.39
Worker has a mood disorder diagnosis	0.34	2.02	10.59	34.62	52.44	4.37
Worker's expectations regarding their recovery	0.33	0.66	10.23	39.77	49.01	4.36
Availability of suitable/alternative work tasks	0.33	2.16	9.95	39.30	48.26	4.33
Whether the job can be modified on the worker's RTW	0.50	1.66	10.78	42.62	44.44	4.29
Preoperative psychological status	0.50	1.67	15.17	34.50	48.17	4.28
Worker's perception that the job can be modified	0.67	1.67	13.67	42.50	41.50	4.23
Postoperative pain intensity	0.66	1.81	11.82	46.63	39.08	4.22
Exposure to repetitive upper limb tasks at work	0.50	2.00	17.47	41.76	38.27	4.15
Exposure to heavy lifting at work	0.50	2.81	17.52	42.81	36.36	4.12
Amount of control a worker has over his/her job	0.67	2.17	19.17	43.00	35.00	4.10
Whether the worker has sought legal advice	1.34	6.05	18.49	32.44	41.68	4.07
Supportive family or spouse	0.67	2.50	20.47	41.93	34.44	4.07
Supportiveness of worker's colleagues	0.67	3.85	20.10	40.20	35.18	4.05
Preoperative poor overall body function	1.01	3.02	20.27	42.71	33.00	4.04
Type of occupation	0.66	3.29	22.24	41.52	32.29	4.01
More than one musculoskeletal pain site	0.67	2.50	21.13	46.26	29.45	4.01
Having a structured suitable duties program	0.33	4.16	23.63	39.27	32.61	4.00
Psychosocial demands of the workplace	0.33	3.68	23.41	41.47	31.10	3.99
Doctor's recommendation for amount of work absence	0.83	4.65	23.92	39.53	31.06	3.95
Workers' compensation claim	2.00	5.32	23.46	34.28	34.94	3.95
Worker's experience of compensation system	1.34	5.88	21.34	41.85	29.58	3.92
Frequent bending/twisting of the wrist or arm at work	0.50	4.49	24.13	45.76	25.12	3.91
Policies and practices of the workplace	0.51	5.90	24.28	43.34	25.97	3.88
Worker has an alcohol or drug abuse problem	1.58	7.19	26.67	33.68	30.88	3.85
Being the primary breadwinner	2.68	5.86	23.95	38.69	28.81	3.85
Whether the worker is claiming compensation	1.49	4.47	28.64	38.91	26.49	3.84
Exposure to vibration to the affected arm at work	1.17	5.54	27.68	41.11	24.50	3.82
Worker's upper limb diagnosis	1.83	7.49	27.79	38.44	24.46	3.76
Worker's understanding of the workers' compensation process and how to navigate the system	1.85	5.70	31.21	40.77	20.47	3.72
Pain intensity or symptom severity before surgery	1.17	7.67	31.50	39.83	19.83	3.70
Presence of a comorbidity	1.00	10.85	34.56	35.39	18.20	3.59
Multiple HCPs involved	1.69	10.34	34.41	35.93	17.63	3.57
Education level	3.51	10.02	34.22	35.56	16.69	3.52
Presence of in-house RTW coordinator	1.70	15.65	39.46	27.89	15.31	3.39
Obesity	2.59	16.06	39.72	25.56	16.06	3.36
Annual income	7.84	15.84	34.92	26.58	14.82	3.25
Age	5.32	17.30	39.27	29.78	8.32	3.18
Worker's presurgery cardiovascular fitness	4.04	22.67	42.88	21.44	8.96	3.09
Which insurer is managing the worker's claim	9.24	20.29	38.95	21.92	9.60	3.02
Worker is a smoker	7.96	26.19	35.40	19.82	10.62	2.99
Hand dominance	17.69	15.82	30.61	25.34	10.54	2.95
Ethnicity	10.77	23.08	38.29	18.46	9.40	2.93
Whether the worker had a preemployment medical evaluation within the last 12 months	25.53	36.08	23.63	8.86	5.91	2.34
Gender	34.69	27.24	30.12	6.77	1.18	2.13

RTW = return to work; HCP = health-care provider.

^a Mean average rating from 5-point Likert scale data.