

Role of Demographics, Medical and Psychosocial Factors in a Successful Return to Work Following a Compensated Rotator Cuff Surgery

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Abstract

Objectives: The purpose of this study was to examine the impact of patient characteristics on return to work (RTW) following a work-related rotator cuff (RC) injury which required surgery.

Methods: This was a retrospective review of the electronic files of injured workers who had their assessment and surgery performed at an Upper Extremity Specialty Program. The baseline patient-oriented outcome measures were the Quick DASH, the Hospital Anxiety and Depression Scale (HADS) and the Numeric Pain Rating scale (NPRS).

Results: Data of 210 patients, 73 (35%) females, 137 (65%) males, (mean age = 54, SD = 9) who had a balanced number of surgeries (70 RC repair, 70 RC decompression, and 70 RC decompression and repair) were reviewed. At the time of final assessment, 20(10%) patients were performing regular duties, 111 (53%) were performing modified duties and 79 (38%) were not working. The univariable logistic regressions of baseline demographics showed that pre-operative work status was a significant predictor of work-status at final assessment ($X^2: 7.05, p = 0.01$). Female workers were more successful in their RTW as compared with their male counterpart ($X^2: 8.45, p = 0.01$). Post-operative medical barriers (injury-related and pre-existing conditions) ($X^2: 5.42, p = 0.02$) and psychological barriers (worker, workplace) ($X^2: 4.19, p = 0.04$) contributed significantly to a successful RTW. Age, job demands, type of surgery, Quick DASH, pain, depression or anxiety did not have a statistically significant relationship with RTW. In the forward stepwise logistic regression that included all factors, the same variables maintained their significance as independent predictors of RTW.

Conclusions: Pre-operative work status, medical/psychological barriers, and gender play important roles in return to regular duties following a work-related rotator cuff surgery.

Keywords: Compensation; Predictor; Return to Work; Psychosocial Factors

Introduction

Work-related shoulder injuries are an important cause of prolonged disability [1-6] and rotator cuff tears are highly involved in these incidents [7-9]. Injured workers are reported to have a less optimal outcome as compared with the general population [10-17]. Although recovery can be measured by patient-oriented outcome measures, RTW remains the most important indicator of surgical success from both the patient and the employer perspective. There is limited information on specific risk factors for a successful RTW within the in-

jured workers' population [18-22]. Further assessment of the baseline characteristics is warranted as this information will help to better manage modifiable predictors of RTW. The purpose of this study was to examine the impact of patient characteristics on RTW after a work-related rotator cuff (RC) injury that required surgery.

Methods

Subjects

This was a retrospective review of the electronic files of injured workers referred to an Upper Extremity Specialty Program. Patients with diagnosis of fracture, infection, advanced osteoarthritis of the glenohumeral joint or inflammatory arthritis were excluded.

All patients included in this study were seen by Orthopedic surgeons with fellowship training in shoulder surgery and a specialized physical therapist with post graduate training and experience in shoulder examination. The diagnoses included subacromial impingement and partial or full-thickness rotator cuff (RC) tears. All patients had failed appropriate non-operative treatment courses, and subsequently undergone a surgical management including arthroscopic RC decompression, RC repair or concurrent RC decompression and repair. We chose an equal number of patients in each surgical group. Approval for using the existing data was obtained from the Research Ethics Board of the Sunnybrook Health Sciences Centre.

Patient-oriented outcome measures

As a part of routine care in the Upper Extremity Specialty Program, all patients completed the Quick Disabilities of the Arm, Shoulder and Hand (Quick DASH) [23], a Numeric Pain Rating Scale (NPRS) and the Hospital Anxiety and Depression Scale (HADS) [24] on the initial visit. The disability/symptom component of the Quick DASH has 11 questions on a Likert scale [23] ranging from 0 to 100 with higher scores indicating higher disability. QuickDASH has been reported to be valid and reliable in patients with upper extremity conditions [23,25,26]. The NPRS uses a 0 to 10 scale with 0 being no pain and 10 being the worst imaginable pain and is valid for clinical use [27,28]. The HADS is a 14-item scale [24]. Seven of the items relate to anxiety and seven relate to depression. The possible scores range from 0 to 21 for anxiety and 0 to 21 for depression with higher scores representing worse mental well-being. The HADS has acceptable measurement properties in patients with musculoskeletal and shoulder conditions [20,29-31]. Patients were seen at multiple times following surgery. For the purpose of this study, the last follow-up visit was used to document the work status at final follow up.

Statistical analysis

The sample size was based on potential predictors of RTW. Considering the strongest predictor of RTW and recovery has been reported to be the psychosocial factors, the sample size was based on the incidence of yellow flags. In a study of patients with different levels of yellow flags [30], the percentage of patients who worked full-time was 79%, 58%, and 37% for no flags, less than three and ≥ 3 flag signs. To detect a difference in work status between patients without any yellow flags and those with minimal number of flags (< 3), at $\alpha = 0.05$ and power of 0.80, we required a minimum of 154 patients [32]. Considering that pathology plays an important role in RTW, a larger sample of 210 with a balanced number of patients (70 patients) in each surgical group (decompression, repair, both) was chosen. This sample was considered sufficient for a stepwise logistic regression of 10 predictors and the rule of event per variable (EPV) of 20 [33]. Descriptive statistics [number (n), mean, standard deviation (SD), minimum, and maximum] were performed for variables of interest. Univariable logistic regressions were conducted with the RTW as the dependent variable. The independent predictors were age, gender, job demands, type of surgery, pre-op Quick DASH, pain, depression and anxiety, and post-operative medical and psychological barriers. In the forward stepwise logistic regression, all variables were entered into the model. Statistical analysis was performed using SAS® version 9.1.3 (SAS® Institute, Cary, NC). Statistical results are reported using 2-tailed p values with significance set at $p < 0.05$.

Results

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Data of 210 patients, 73 (35%) females, 137 (65%) males, (mean age = 54, SD = 9) were reviewed. Seventy workers had surgery for RC repair with 70 having a RC decompression and 70 having both RC decompression and repair. The repair group had the shortest timeframe from injury to surgery (9 months, SD: 6) with the decompression group (12 months, SD: 5) being comparable to the group with both surgeries (13 months, SD: 13) ($p = 0.03$). More women had RC decompression surgery (43% vs. 28%) and more men had RC repairs (40% vs. 21%, $X^2 = 8.73$, $p = 0.01$). At the time of final assessment at an average of 10 months (SD: 3), 20 (10%) were working their pre-injury jobs (fulltime regular duties), 111 (53%) were performing modified (accommodated, alternative) duties and 79 (38%) were not working.

The univariable logistic regressions of demographics showed that pre-operative work status was a significant predictor of work-status at final assessment ($X^2 = 7.05$, $p = 0.01$). Post-operative medical barriers (injury-related and pre-existing conditions) ($X^2 = 5.42$, $p = 0.02$) and psychological barriers (worker and workplace) ($X^2 = 4.19$, $p=0.04$) contributed significantly to a successful RTW. Female workers were more successful in their RTW as compared with their male counterpart ($X^2 = 8.45$, $p = 0.01$). Whereas 10 (14%) of the female workers were performing full-time regular duties and 45 (62%) were doing modified duties, only 10 (7%) of male workers were back to regular duties and 66 (31%) were working modified duties. The number of men being off work was 61 (45%) vs. 18 (25%), showing women generally had a better RTW status. In addition, age, job demands, type of surgery, and score of Quick DASH, pain, depression or anxiety did not have a statistically significant relationship with RTW (Table 1).

In the forward stepwise logistic regression, all three variables; pre-op work status ($X^2 = 32.31$, $p < 0.0001$), post-op barriers ($X^2 = 14.27$, $p = 0.0002$) and gender ($X^2 = 4.94$, $p = 0.026$) maintained their significance as independent predictors of RTW (Table 1).

Predictor variables	Estimate	Odd Ratio (CI)	Wald X^2	P value
Age	0.01	1.01 (0.98-1.04)	0.14	0.70
Gender (2 categories) Female vs. Male	0.42	2.30 (1.31-4.12)	8.45	0.01
Job Demands (3 categories)	0.03	0.99 (0.54-1.84)	0.03	0.88
Heavy vs. Light	-0.06	0.91 (0.45-1.86)	0.08	0.78
Moderate vs. Light				
Pre-op Work Status (3 categories)	13.49	13.49 (3.50-52.08)	7.05	0.01
Regular vs. Not working	1.61	5.94 (0.52-4.34)	1.61	0.20
Modified vs. Not working				
Pre-op Physical and Mental Scores	0.02	1.02 (0.91-1.13)	0.11	0.74
• Pain	-0.01	0.99 (0.98-1.04)	1.14	0.28
• QuickDASH	-0.02	0.98 (0.94-1.03)	0.80	0.37
• Depression	-0.02	0.98 (0.93-1.03)	0.62	0.43
• Anxiety				
Type of Surgery (3 Categories)	0.13	1.19 (0.63-2.26)	0.48	0.49
Decompression vs. Both Surgeries	-0.09	0.95 (0.50-1.81)	0.22	0.64
Repair vs. Both Surgeries				
Barriers to RTW	-0.45	0.25 (0.13-0.48)	5.42	0.02
None vs. Medical	-0.46	0.25 (0.12-0.53)	4.19	0.04
None vs. Psychological				

Table1: Results of Univariable Logistic Regression (Response Variable: Post-surgical Work Status).

Work status: Three categories; full-time regular duties, modified duties, and non-working.

Discussion

The present study examined the impact of demographics and patient characteristics including the post-operative medical and psychosocial factors on RTW in injured workers treated at an Upper Extremity Specialty Program using a balanced number of patients with different types of rotator cuff surgery. A desirable work status prior to surgery is an important factor for a successful RTW after surgery as it indicates availability of modified duties and flexibility of physical demands that will match the employee's abilities as they recover from surgery. Our results suggest that keeping the workers at a job that they can handle prior to surgery will help them to return to work more successfully after surgery.

There is strong evidence in the occupational literature that poor psychological well-being is an indicator of poor recovery and failure at work after a compensable shoulder injury [20,20,29,30,34-38]. Our study further confirms the critical role of psychosocial factors in a successful RTW. In the present study, the worker and work-place factors were identified by the clinicians in the conversation they had with the workers. Utilizing more robust surveys will help to better identify patients with positive psychological vulnerabilities who could benefit from a more targeted management [39,40].

We found that women performed better in returning to work. There are inconsistencies in the literature about the role of gender on RTW. Some investigators have identified the male gender as a predictor of a more successful RTW [41-43]. Others have reported that women were more likely to RTW more sustainably than men [44,45]. This discrepancy may indicate the influence of other complex factors such as differential physical and mental occupational demands, type of sector, temporary or contract job that may affect job security, personal, cultural and social factors, access to the health care system, pay inequality and etc. To optimize post-surgical management of compensated shoulder injuries, further research is needed to better understand the complex inter-relationships among factors that affect RTW outcomes for both men and women.

In the present study, there was inconclusive relationship between RTW and age, job demands, and baseline physical and mental well-being. There is evidence that younger employees have a higher probability of remaining at work after RTW than the older employees [46]. Similarly, job demands have been mentioned as an important factor in RTW by some investigators [11,19,21,47,48]. Nové-Josserand, *et al.* [21], reported a linear relationship between time to RTW and extent of manual work. Bhatia, *et al.* [19] reported a trend towards decreased return to regular duties with increasing work level. The higher levels of disability and mental well-being (depression and anxiety) in injured workers as compared with the general population have been established [20,29,30,49,49,50]. In the sample studied, lack of statistically significant differences in age, job demands, and baseline PROs may be due to using a homogeneous sample of injured workers which reduces the variability in certain factors and leads to insignificant statistical differences.

In summary, this study demonstrated that poorer pre-operative work status, higher medical and psychological and the male gender had a negative influence on RTW. Failure to a successful RTW results in social and economic burdens following a compensated RC surgery and deserves a detailed assessment of all gender-related physical and psychosocial factors in the future studies.

Conclusions

Pre-operative work status, medical/psychological barriers, and gender play important roles in return to regular duties following a work-related rotator cuff surgery.

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