



## Original Article

# Predicting Employment Status of Injured Workers Following a Case Management Intervention

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## ABSTRACT

*Background:* The success of an injury intervention program can be measured by the proportion of successful return to work (RTW). This study examined factors of successful return to employment among workers suffering from work-related injuries.

*Methods:* Data were obtained from the Social Security Organization, Malaysia database consisting of 10,049 RTW program participants in 2010–2014. The dependent variable was the RTW outcome which consisted of RTW with same employer, RTW with new employer or unsuccessful return. Multinomial logistic regression was performed to test the likelihood of successful return with same employer and new employer against unsuccessful return.

*Results:* Overall, 65.3% of injured workers were successfully returned to employment, 52.8% to the same employer and 12.5% to new employer. Employer interest; motivation; age 30–49 years; intervention less than 9 months; occupational disease; injuries in the lower limbs, upper limbs, and general injuries; and working in the manufacturing, services, and electrical/electronics were associated with returning to work with the same employer against unsuccessful return. Male, employer interest, motivation, age 49 years or younger, intervention less than 6 months, occupational disease, injuries in the upper limbs and services sector of employment were associated with returning to new employer against unsuccessful return.

*Conclusion:* There is a need to strengthen employer commitment for early and intensified intervention that will lead to improvement in the RTW outcome.

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## 1. Introduction

Injuries and illnesses among workers occur as a result of accidents at the workplace, commuting accidents, or diseases. These could lead to death or major disability, the latter is often associated with inability to work, sick leave, and reduced productivity and employability, which in turn could lead to socioeconomic burden to individuals, families, employers, and society. Occupational injuries result in economic losses to employers and negative consequences, financially, physically, and psychologically for employees [1,2]. Employers face costly early retirements, loss of skilled staff, absenteeism, and high insurance premiums due to work-related accidents and diseases while employees face disabling/disruption to professional, personal, and family life. Globally, occupational accidents and work-related diseases cause over 2.3 million fatalities

a year, and there were over 317 million accidents that occur on the job annually [3]. A declining trend was reported in the number and rate of work-related injuries and illnesses in several western countries including Canada, United States, and Italy [4,5], over the last two decades; however, serious injuries resulting in longer disability and higher compensation costs have not really decreased. It has been cited that in 2005, over 90% of occupational injuries worldwide occurred in the lower income and middle-income countries, especially in those emerging economies that have the greatest concentration of workforce in low-level occupational health and safety services workplace [6,7].

Workers' health, prevention of injuries, and recovery of the injured are indeed matters of public health. Recognizing the high costs of work-related injuries, the profound impacts of these injuries on employees and employers, and the importance of work

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ability for maintaining a working life, many developed countries in Europe, North America, and Australasia have implemented a number of structured postinjury intervention strategies and programs through various stakeholders for the purpose of getting injured workers to return to work (RTW). Hence the term RTW has been widely used although it does not really have a shared meaning among the different researchers. RTW can be referred to as a phenomenon encompassing an intervention, a process, or an outcome [8,9]. Studies have shown that interventions such as rehabilitation programs, psychosocial interventions, case management, and workplace-based RTW strategies can reduce the duration of work disability and help injured workers RTW [10,11] and that early RTW leads to better outcomes for injured workers [12].

The success of any intervention program can be measured by the proportion of injured workers who were able to achieve a safe, timely, and sustainable return to the workforce and their productive contributions thereafter. As RTW is multifaceted, its success is contingent upon the motivations, interests and concerns of all stakeholders namely workers, employers, payers, health-care providers, and government/society [13]. Successful RTW be it an intervention, a process, or an outcome is influenced by a multitude of factors which include demographic, injury-related factors, psychological as well as psychosocial factors [2,11,14–16].

In Malaysia, it is mandatory for workers with a monthly salary of RM3000 and below (RM4000 and below as of June 2016) together with their employers to contribute to the Social Security Organization (SOCSO), a statutory body under the Ministry of Human Resources. SOCSO was established in 1971 with the aim to administer, enforce, and implement the Employees' Social Security Act, 1969 which covers two types of social protection schemes namely the Employment Injury Insurance Scheme and the Invalidity Pension Scheme. Since its establishment the focus of SOCSO has been on cash payment and in kind benefits to their insured members and their dependents in the event of a contingency. However, beginning in 2007 in its efforts to expand its services due to the increasing number of work-related injuries and illnesses and to encourage reemployment and social reintegration of the disabled and injured workers, SOCSO introduced an intervention program called the RTW program.

The overall focus of the RTW program focuses more on post-injury rehabilitation of the injured workers who are insured by SOCSO to assist them to RTW in a safe and timely manner using a biopsychosocial approach and case management strategy. It is a closely supervised scheme whereby every injured worker is assigned a “case manager” to facilitate the intervention and rehabilitation process based on the model as shown in Fig. 1.

The success of a RTW program can be measured by the RTW outcome which is the number and/or proportion of injured workers participating in the program who have successfully returned to work. From January 2007 to December 2015, a total of 12,981 insured persons have been successfully rehabilitated and returned to work [17]. Successful RTW constitutes return to the same employer before injury or a different employer. The interest of this article was to examine the reemployment workplace and its determining factors of workers who have successfully resumed work.

## 2. Materials and methods

Data were extracted from SOCSO database comprising injured workers who participated in the RTW rehabilitation program from 2010 to 2014 of which 10,049 cases were available for analysis. Individual record includes information related to the worker's demographic profile, employment, injury, rehabilitation, and outcome of the RTW program.



Fig. 1. Model of the return to work program.

The variable of interest was the outcome of the RTW program which refers to the event of resuming work. It originally consisted of eight categories of employment hierarchy namely, same job same employer, similar job same employer, different job same employer, same job different employer, similar job different employer, different job different employer, self-employed, and unsuccessful. However, for purposes of analysis these categories were combined into three groups, that is, RTW with the same employer, RTW with a new employer, and no formal employment which include the self-employed and unsuccessful cases.

Chi-square tests were used to examine the associations between RTW outcomes and selected independent variables which include gender, age, employment industry, cause of injury, type of injury, duration of rehabilitation, company interest, and motivation. Company interest refers to whether an employer is willing to reemploy an injured worker or someone with disability caused by an injury or illness; whereas, motivation of the worker was measured at the point of screening as to whether the worker was keen and enthusiastic about following the RTW program. Multinomial logistic regression was subsequently performed on the outcome of RTW intervention with “no formal employment” as the referent. Multinomial logistic regression is an extension of logistic regression when the dependent variable is nominal with more than two levels. It is a predictive analysis that allows testing the likelihood of successful RTW with the same employer and new employer against unsuccessful return to formal employment, respectively, using the odds ratios (ORs) generated from the model [18,19]. Applications of the multinomial logistic regression analysis in examining factors related to RTW can be found in other studies [2,15,16] using data from South Korea, Taiwan, and Sweden, respectively.

## 3. Results

Of the total 10,049 injured workers who participated in the RTW program, 6567 (65.3%) had successfully returned to employment; 52.8% resumed work with the same employer and 12.5% resumed work with a new employer (Table 1). The RTW with same employer, different employer, and no formal employment over the 5-year period shown in Table 2 suggests a declining trend in the proportion of injured workers returning to the same employer from about 60% in 2010 to 42% in 2014. The proportion of those who returned

to work with a different employer and those with no formal employment remained relatively the same at about 13% and 35%, respectively, except for 2014 where more than half of the injured workers had no formal employment.

At baseline, almost 80% of the participants were male, 63% were aged 39 years or younger while about 27% were aged 40–49 years. Slightly more than half of the participants suffered injuries due to commuting accident (53.8%) followed by workplace injury (31.6%) and occupational disease (14.6%) with 34.4% of the injuries occurring in the lower limbs and 27.4% in the upper limbs. Manufacturing and services registered the highest incidence of injury with 27.3% and 22.5%, respectively. Table 1 also indicates that 40% of the participants had their intervention completed within 3 months, 96% were motivated throughout the intervention period, and about 47% of the employers were interested in hiring an injured worker. The Chi-square statistics suggest that there were significant associations between the RTW outcomes and all selected variables.

Results from adjusted multinomial regression analysis of RTW with same employer and new employer against the reference category “no formal employment” are shown in Table 2. Comparing the return to the same employer with no formal work groups, those who returned to their former employers were significantly more likely to comprise workers who: (1) were employed in companies interested in hiring injured/disabled workers [OR = 25.49, 95% confidence interval (CI) = 21.94–29.61], (2) were aged 30–49 years compared with those 50 years and older (OR = 1.33~1.48, 95% CI = 1.09~1.22–1.62~1.80), (3) had intervention period <10 months (OR = 2.25~3.41, 95% CI = 1.86~2.89–2.64~4.01), (4) were motivated (OR = 5.22, 95% CI = 3.61–7.56), (5) suffered from occupational disease compared to workplace injury (OR = 1.58, 95% CI = 1.04–2.39), (6) worked in manufacturing, services, public service, or electronics/electrical compared to those who worked in transportation industry (OR = 1.43~1.98, 95% CI = 1.15~1.49–1.78~2.63), and (7) had injury in lower limbs or upper limbs compared with multiple locations injury (OR = 1.54~2.54, 95% CI = 1.30~2.11–1.83~3.06). Workers who suffered from diseases compared with those suffering from injuries in multiple locations were more likely to be in the no formal employment group (OR = 0.16, 95% CI = 0.10–0.26) (Table 3).

Comparing the groups who successfully gained employment with new employers and no formal work, the result indicates that participants who returned to work with new employers were significantly more likely to comprise workers who: (1) were male (OR = 1.21, 95% CI = 1.01–1.47), (2) went to employers with interest in hiring them (OR = 21.97, 95% CI = 18.38–26.25), (3) were younger than 50 years (OR = 1.80~2.96, 95% CI = 1.33~2.20–2.44~3.98), (4) were motivated (OR = 8.42, 95% CI = 4.12–17.21), (5) had occupational disease compared to workplace injury (OR 1.72, 95% CI = 1.01–2.93), (6) worked in services or public service (OR = 1.37~1.51, 95% CI = 1.00~1.14–1.88~2.02], and (7) were injured in the upper limbs compared to multiple locations (OR = 1.74, 95% CI = 1.37–2.21). Whereas workers who had intervention period of less than 6 months were injured due to

commuting accidents, and those who worked in agricultural, forestry, and fishing were significantly more likely to be in the no formal employment group.

#### 4. Discussion

Overall, the RTW program implemented by SOCSO using biopsychosocial and multidisciplinary case management approach can be considered successful with average success rate of about 65% from 2011 to 2014. Data showed that 52.8% of injured workers had successfully returned to employment with the same employer while 12.5% were hired by new employer.

The results indicate that while there was no gender difference in the successful return to the same employer, males were more likely to RTW with a new employer. Understandably it would be easier for employers to absorb back their injured workers regardless of sex especially to their preinjury jobs. Whereas for a new employer, hiring depends very much on availability of job vacancies and suitability of the applicants. Employer interest in rehiring or hiring injured workers was significantly associated with the return to gainful employment. Similarly, injured workers' motivation was a significant factor of successful RTW for the same employer as well as new employer. It would be reasonable to argue that workers undergoing such a structured case management approach involving many stakeholders would be highly motivated knowing that their former employers are keen to accept them back. Consistent with earlier studies, injured workers aged 50 years and older were less likely to return to employment, particularly, with a new employer [2,14,15]. While workers aged 30 years or younger were found to be less likely to return to preinjury job [2], it was not statistically significant in this study.

Shorter duration of intervention was significantly associated with greater probability of returning to work with the same employer, similar to earlier finding, [15] but they were less likely to be employed by a new employer. Short intervention period could imply injury of less severity and positive response from rehabilitation of the injured workers which would lead to quick recovery. Employers would rather wait for these workers to come back than to replace them with new workers. The results also suggest that compared to workplace injury, workers who suffered from occupational diseases were more likely to RTW either with same employer or new employer. In contrast, workers who were injured due to commuting accidents were less likely to RTW more so with a new employer compared to those who were injured at the workplace. Commuting accidents in Malaysian are common among young male workers who use motorcycles to commute to the workplace and are more likely to suffer from serious injuries and may take a long time to recover; therefore, they are less likely to RTW especially in jobs requiring workplace accommodations.

Compared with workers who were employed in the transportation sector, those in the services and public service were more likely to return to the same employer or new employer compared to workers who did not return to formal employment. Accidents involving workers in the transportation sector are more likely to occur when they are at work such as while driving a passenger bus or a delivery truck, and for reasons that they could be traumatized, they would not want to go back to formal employment. The result also shows that compared with workers who suffered multiple location injuries, those with limb injuries and general injuries were more likely to return to employment with the same employer. It would be reasonable to argue that injuries in the upper or lower limbs as well as general injuries are not as serious as multiple location injuries and therefore may not take long to recover and get back to work.

**Table 1**  
Return to work outcome 2010–2014

Year	Same employer	Different employer	No formal employment
2010	1485 (59.6)	348 (14.0)	659 (26.4)
2011	1176 (55.1)	281 (13.1)	679 (31.8)
2012	1125 (50.6)	306 (13.7)	794 (35.7)
2013	898 (52.1)	226 (13.2)	598 (34.7)
2014	624 (42.3)	98 (6.7)	752 (51.0)
Total	5308 (52.8)	1259 (12.5)	3482 (34.7)

**Table 2**  
Associations between RTW outcome and selected variables

Variable		Total	RTW with same employer	RTW with new employer	No formal employment	Chi-square
Gender	Male	8031 (79.9)	4313 (53.7)	1036 (12.9)	2682 (33.4)	28.48*
	Female	2018 (20.1)	995 (49.3)	223 (11.1)	800 (39.6)	
Company interest	Yes	4705 (46.8)	3648 (77.5)	816 (17.3)	241 (5.1)	3412.96*
	No	5344 (53.2)	1660 (31.1)	443 (8.3)	3241 (60.6)	
Age (y)	29 and below	3183 (31.7)	1767 (55.5)	519 (16.3)	897 (28.2)	211.63*
	30–39	3130 (31.1)	1748 (55.8)	375 (12.0)	1007 (32.2)	
	40–49	2686 (26.7)	1311 (48.8)	291 (10.8)	1084 (40.4)	
	50 and above	1050 (10.5)	482 (45.9)	74 (7.0)	494 (47.0)	
Intervention period	1–3 months	4058 (40.4)	2486 (61.3)	391 (9.6)	1181 (29.1)	506.55*
	4–5 months	2531 (25.2)	1430 (56.5)	303 (12.0)	798 (31.5)	
	6–9 months	1639 (16.3)	841 (51.3)	216 (13.2)	582 (35.5)	
	10 months or more	1821 (18.1)	551 (30.3)	349 (19.2)	921 (50.6)	
RTW motivation	Motivated	9606 (95.6)	5267 (54.8)	1251 (13.0)	3088 (32.1)	603.24*
	No motivated	443 (4.4)	41 (9.3)	8 (1.8)	394 (88.9)	
Cause of injury	Commuting accident	5407 (53.8)	3109 (57.5)	639 (11.8)	1659 (30.7)	781.63*
	Occupational disease	1472 (14.6)	304 (20.7)	228 (15.5)	940 (63.9)	
	Workplace injury	3170 (31.6)	1895 (59.8)	392 (12.4)	883 (27.9)	
Industry	Manufacturing	2748 (27.3)	1618 (58.9)	288 (10.5)	842 (30.6)	153.06*
	Construction	690 (6.9)	344 (49.9)	89 (12.9)	257 (37.2)	
	Services	2258 (22.5)	1153 (51.1)	330 (14.6)	775 (34.3)	
	Public service	1401 (13.9)	777 (55.5)	184 (13.1)	440 (31.4)	
	Agricultural, forestry, and fishing	454 (4.5)	244 (53.7)	38 (8.4)	172 (37.9)	
	Electronics/electrical	609 (6.1)	350 (57.5)	65 (10.7)	194 (31.9)	
	Others	1001 (10.0)	407 (40.7)	164 (16.4)	430 (43.0)	
	Transportation	888 (8.8)	415 (46.7)	101 (11.4)	372 (41.9)	
	Injury type	Lower limbs	3456 (34.4)	1978 (57.2)	404 (11.7)	
Diseases		1312 (13.1)	211 (16.1)	205 (15.6)	896 (68.3)	
Upper limbs		2756 (27.4)	1879 (68.2)	320 (11.6)	557 (20.2)	
General injuries		1051 (10.4)	532 (50.6)	123 (11.7)	396 (37.7)	
Multiple locations		1474 (14.7)	708 (48.0)	207 (14.0)	559 (37.9)	
Total		10,049 (100.0)	5308 (52.8)	1259 (12.5)	3482 (34.7)	

RTW, return to work.

\*p 0.05.

It is well recognized that structured intervention and rehabilitation programs such as the RTW program has proven to help improve the recovery of injured workers, shorten the number of days of work absence and return to gainful employment. Having a job in the face of

economic uncertainty is key in maintaining one's working life more so for an injured worker. It has also been shown that early intervention though may cost more in the initial stage could in the long run provides substantial savings for employers and payers [20].

**Table 3**  
Multinomial logistic regression models of RTW outcomes

Variable	Same employer versus no formal employment		New employer versus no formal employment		
	Adjusted OR	95% CI	Adjusted OR	95% CI	
Gender	Male	1.030	0.893–1.187	1.213	1.005–1.466*
	Female	(reference)			
Company interest	Yes	25.487	21.938–29.609**	21.967	18.383–26.250**
	No	(reference)			
Age (y)	29 and below	1.181	0.969–1.439	2.961	2.201–3.983**
	30–39	1.483	1.220–1.803**	2.268	1.684–3.054**
	40–49	1.332	1.093–1.624**	1.799	1.329–2.436**
	50 and above	(reference)			
Intervention period	1–3 months	3.405	2.890–4.011**	0.796	0.654–0.968*
	4–5 months	2.213	1.858–2.636**	0.795	0.644–0.980*
	6–9 months	2.245	1.859–2.710**	0.964	0.768–1.210
	10 months or more	(reference)			
RTW motivation	Motivated	5.223	3.607–7.561**	8.416	4.115–17.210**
	Not motivated	(reference)			
Cause of injury	Commuting accident	0.997	0.875–1.137	0.828	0.695–0.986*
	Occupational disease	1.579	1.044–2.387*	1.722	1.011–2.933*
	Workplace injury	(reference)			
Industry	Manufacturing	1.505	1.215–1.865**	1.095	0.819–1.462
	Construction	1.115	0.846–1.470	1.197	0.831–1.724
	Services	1.428	1.149–1.775**	1.512	1.135–2.015**
	Public service	1.504	1.185–1.909**	1.372	1.001–1.881*
	Agricultural, forestry, and fishing	0.940	0.678–1.303	0.574	0.360–0.915*
	Electronics/electrical	1.979	1.489–2.631**	1.241	0.838–1.838
	Others or not employed	0.803	0.619–1.040	1.310	0.948–1.812
	Transportation	(reference)			
	Injury type	Lower limbs	1.544	1.304–1.829**	1.089
Diseases		0.162	0.102–0.258**	0.591	0.332–1.052
Upper limbs		2.540	2.113–3.055**	1.738	1.365–2.212*
General injuries		1.273	1.015–1.597*	0.885	0.653–1.198
Multiple locations		(reference)			

CI, confidence interval; OR, odds ratio; RTW, return to work.

\*p < 0.05, \*\* p < 0.01.

Therefore there is a need to strengthen the role of stakeholders and the relationships between the involved parties that would enforce employers' commitment to include the injured and the disabled in their workforce [21,22]. The stakeholders include government, SOCSO personnel, employer and trade union bodies, the disability movement, health professionals, and other service providers in Malaysia. Efforts were made by SOCSO to encourage employers to be more involved in the RTW program of their workers from the onset of their injury and the Government is giving a number of tax incentives for employers who hire people with disabilities. However, the number of employers who take an active role is relatively quite low. Findings [23] indicate that lifetime unemployment may be related to disability and shorter life expectancy. This suggests that delayed or unsuccessful intervention of injuries could result in longer spells of unemployment of injured workers which in turn leads to further disability and other complications, stress, depression, loss of social network, and lower life expectancy. An effectively managed and supervised RTW program is a powerful strategy toward empowerment of the injured and disabled.

### Conflicts of interest

All authors have no conflicts of interest to declare.

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### Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.shaw.2017.11.001>.

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