ORIGINAL REPORT

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FACTORS RELATED TO SUCCESSFUL RETURN TO WORK FOLLOWING MULTIDISCIPLINARY REHABILITATION

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Objective: To examine factors associated with successful return to work among participants in a Social Security Organisation Return To Work programme.
Methods: Secondary data for 9,850 participants were obtained from the Social Security Organisation Return To Work database. The dependent variable was the Return To Work programme outcome, successful return to employment (same employer or different employer) or unsuccessful return. Logistic regression analysis with weighted sum contrasts was performed to assess the odds ratios with 95% confidence interval (95% CI) for successful return to employment across the various subgroups of participants.
Results: Overall, 65.5% of participants successfully returned to employment, either with their former employers or with new employers. Successful return to employment was found to be significantly higher than the overall proportion among those participants who had had commuting accidents, followed by those who had had workplace accidents. Successful return to employment was also associated with injuries of the upper and lower limbs, employers who were interested in hiring disabled workers, motivation to participate in the programme, an intervention period of 3 months or less, age 29 years or younger, and male participants.
Conclusion: A structured multidisciplinary intervention programme provides a positive outcome in terms of returning to work. Related factors have various impacts on successful return to work.

Previous studies have shown that early intervention, appropriate rehabilitation and medical care, as well as having supportive family members, friends and work colleagues, can help reduce the negative consequences of work-related injuries and illnesses. This will, in turn, increase the likelihood of an injured worker returning to work, hence reducing the number of days of absence (1, 2). The length of work absence has been found to be positively associated with higher costs to the employer and negatively related to the likelihood of the employee's successful return to employment (3). In view of the increasing trend in work-related injuries and its impact in terms of both the economic and social burden on workers, families, employers and governments, many interventions and vocational rehabilitation programmes have been introduced, including the return to work (RTW) disability management programme. RTW is a concept encompassing all initiatives intended to facilitate the workplace reintegration of persons who experience a reduction in work capacity or capability (4). While the term RTW is commonly used and well recognized in terms of its significant role in economic empowerment amongst persons with disabilities through re-employment after rehabilitation, understanding of RTW in terms of its shared meaning seems very low. Young et al. (5) define the term RTW as: RTW stakeholder, which includes persons or organizations; RTW goal, which refers to a mutually acceptable target; RTW process, which encompasses events and phases towards achieving the RTW goal; and RTW outcome, which describes the workers' RTW experience including employment status.

In many developed countries, employers bear the main responsibility of returning an injured worker to pre-injury duties (6), while in other countries, the responsibility lies with the government. The evolution of RTW discussed by Batterson et al. (7), suggest that, in the 1970s and early 1980s, most employers treated work-related injuries as a short-term disability with a distinct separation between being able and unable to perform the job, which typically requires employees to have fully recovered before going back to their employers. However, the trend has changed towards getting employees to return to work before full recovery, even in a limited capacity, as it would benefit both employees and employers.

Globally, it has been shown that the RTW intervention produced positive outcomes with respect to improving the recovery rate and the ability to re-enter work, and that the success of such programmes depends largely on the collaborative efforts of all stakeholders, including workers, employers, healthcare providers and society (2, 5). Earlier studies indicated that compensation payout has also been reduced as a result of RTW program-

mes (8–10). The success of a RTW programme can be measured by the proportion of workers returning to work and, in order to improve this proportion, there is a need to identify the factors that influence this. There has been much research into factors affecting return to work (2, 11–14). For example, Park (13) studied the effect of demographic and injury-related factors on return to work among injured workers in South Korea, while Gustafsson et al. (14) examined the associations between psychological factors and return to work among long-term sickness absentees in Sweden and Eggert (12) conducted a systematic literature review of the psychosocial factors that may affect workers' abilities to return to work.

In 2015 the Malaysian workforce comprised 14.5 million people of the total 20 million working-age population (15–64 years) (15), with approximately 62% males. From July 2013, mandatory retirement was increased from 58 to 60 years. Work-related injuries and illnesses are under the jurisdiction of the Social Security Organization (SOCSO), a statutory body under the Ministry of Human Resources, which was established in 1971 in accordance with the *Employees' Social Security Act 1969*. Malaysian workers with a monthly salary not exceeding RM3000 (RM4000 as of June 2016) together with their employers are mandated to contribute to SOCSO, which administers 2 types of social protection schemes; the Employment Injury Insurance Scheme and the Invalidity Pension Scheme. The former provides protection to those involved in accidents arising out of, and in the course of, his/her employment, while the latter provides 24 h coverage for workers from invalidity or death irrespective of the cause of death. However, the mandate under this Act goes beyond benefit payments of these 2 schemes, but covers wider aspects related to the improvement in health and welfare of affected persons, which includes the provision and maintenance of assistive devices as well as physical and vocational rehabilitation.

The number of active employees registered with SOCSO was 6.2 million in 2015 and the total number of accidents reported increased from 59,897 in 2011 to 62,863 in 2015 (16). Recognizing the rising trend in work-related injuries and illnesses, which led to the increase in economic and social burden, and the importance of work in one's life, SOCSO made a bold move in 2007 to introduce a structured multi-disciplinary intervention programme known as the Return to Work (RTW) programme. The programme was designed to assist insured persons with injury and illness in returning to work in a safe and timely manner through a biopsychosocial approach using a case management strategy. Given that persons with different types of injury face a range of barriers to work, case management was adopted to facilitate interventions and rehabilitation customized for each injured worker.

From 2007 to 2015, a total of 13,114 SOCSO insured members has successfully returned to work, with a mean success rate of approximately 65% (16). In its effort to expand the RTW programme, SOCSO has been working with employers in encouraging them to be more directly involved in the rehabilitation of their respective employees. Thus, the aim of this study was to examine the factors associated with successful return to employment across the socio-demographic background, employment and intervention characteristics, which would provide valuable inputs in improving the success rate of injured workers to return to work in the future.

METHODS

The study used secondary data extracted from the SOCSO RTW database from 2010 to 2013 consisting of 13,169 injured workers who participated in the intervention programme. Each record contains information related to injury or illness, personal characteristics and intervention details. Statistical analyses were performed on 9,850 cases with complete information on the dependent and selected independent variables. However, it should be noted that with the exception of injury type and industry sector, which has approximately 19% and 13% missing cases, respectively, the other variables have less than 5% missing cases.

The dependent variable was the outcome of the RTW programme, which consisted of a hierarchy of 7 levels of job, as followed: same job same employer, similar job same employer, different job same employer, same job different employer, similar job different employer, different job different employer, and self-employed or unsuccessful. The first 6 categories were combined as a single group, which is successful return to formal employment. The data did not contain information on the status of employment whether full-time or part-time. Independent variables included were: year of injury, sex, cause of injury, employer interest, injury type, motivation, intervention period, and age. There were 4 categories of cause of injury, as follows: commuting accident, which includes motor vehicle collisions, workplace accident, illness/diseases, and others. Injury type refers to location of the injury. All of the independent variables were categorical, ranging from 2–5 categories, as shown in Table I. The associations between RTW outcome and the independent variables were examined using χ^2 tests. Multivariate analysis was performed using logistic regression with weighted sum contrasts to generate the proportion of expected success, confidence intervals, and *p*-values. For a binary outcome, a graph of confidence intervals of population proportions is appropriate for comparing the difference between 2 or more groups. The proportion of adverse outcome and its corresponding standard error may be estimated by fitting a logistic regression model, and it is appropriate to use weighted sum contrasts to obtain the standard errors underlying the confidence intervals for comparing these proportions. The method was developed by Tongkumchum & McNeil (17) and further described by Kongchouy et al. (18).

If there are 2 categorical determinants, and p_{ij} denotes the probability of the adverse outcome in categories i and j of these determinants, respectively, the simplest such model takes the additive form:

$$\ln(p_{ij}/(1-p_{ij}))=c+a_i+b_j$$

and, the prevalence itself is thus expressed as:

$$p_{ij}=1/(1+\exp(-c-a_i-b_j))$$

Logistic regression provides a straightforward method for adjusting a prevalence that varies with a determinant of interest for the effect of a covariate determinant. To calculate the adjusted prevalence for category i of the determinant of interest, the term b_j is replaced by a constant b, that is,

$$p_{ij}* = 1/(1+\exp(-c-a_i-b_j)$$

The value of b is chosen to ensure that the sum of the expected number of adverse outcomes is equal to the sum of the observed number, that is,

$$\Sigma p_i * n_i = \Sigma p_i n$$

where n_i is the sample size in category i of the determinant of interest. This method extends straightforwardly to additional covariates.

Applications of the method can be found in several other studies (18–21). The proportion of the weighted sum contrasts does not involve selecting a reference group and it will give full information about confidence interval for comparing each proportion with the overall proportion. Statistical analysis and graphical presentations were performed using R statistical software (R Core Team, 2013) (22).

RESULTS

Of the total 9,850 participants in the RTW intervention programme, 6,451 workers (65.5%) successfully returned to work with their former employers or were re-employed by new employers.

Table I indicates that the RTW outcomes are significantly associated with all the independent variables. Participants who had had workplace injury registered the highest proportion of successful return to work (75.8%), followed by those who had had commuting accidents (73.6%), and then occupational diseases (55.5%). In terms of the type of injury, those with upper limbs injury had the highest proportion of success (81.3%), followed by lower limbs injury (70.0%) and multiple locations (62.2%). Successful return to work was highest in 2010 (70.1%), followed by 2011 (66.1%), and 2013 (63.7%). The majority of the injured workers who participated in the RTW programme were male and that the success rate was higher among male workers than female workers (67.4% and 58.2%, respectively).

The majority of injured workers who were motivated to participate in the RTW programme were successful in getting back to work (68.9%). Similarly, the proportion of successful return to work was exceptionally high (93.9%) among employers with a high interest in re-employing their injured or disabled employees. Successful rate of RTW was significantly associated with shorter intervention period and decreased with increasing age.

Table II presents the estimates of the proportion of successful RTW outcome together with the 95% confi-

Table I. Association between return to work (RTW) outcomes by selected variables

Variables	Unsuccessful RTW n (%) (n = 3,399)	Successful RTW n (%) (n = 6,451)	Total (n = 9,850)	χ^2
Cause of injury				< 0.001
Commuting accident	1,177 (26.38)	3,285 (73.62)	4,462	
Occupational disease	114 (44.53)	142 (55.47)	256	
Workplace injury	647 (24.20)	2,027 (75.80)	2,674	
Others	1,461 (59.44)	997 (40.56)	2,458	
Type of injury				< 0.001
Lower limbs	1,004 (30.01)	2,341 (69.99)	3,345	
Illnesses/diseases	808 (68.71)	368 (31.29)	1,176	
Upper limbs	471 (18.71)	2,047 (81.29)	2,518	
General injuries	554 (41.84)	770 (58.16)	1,324	
Multiple locations	562 (37.79)	925 (62.21)	1,487	
Employer interest				< 0.001
Not interested	3,088 (65.09)	1,656 (34.91)	4,744	
Interested	311 (6.09)	4,795 (93.91)	5,106	
Motivation				< 0.001
Not motivated	505 (90.18)	55 (9.82)	560	
Motivated	2,894 (31.15)	6,396 (68.85)	9,290	
Intervention period				< 0.001
≤ 3 months	1,143 (29.41)	2,743 (70.59)	3,886	
4–5 months	720 (29.93)	1,686 (70.07)	2,406	
≥ 6 months	1,536 (43.17)	2,022 (56.83)	3,558	
Age				< 0.001
≤ 29 years	794 (26.11)	2,247 (73.89)	3,041	
30–39 years	1,020 (33.11)	2,061 (66.89)	3,081	
40–49 years	1,134 (41.19)	1,619 (58.81)	2,753	
≥ 50 years	451 (46.26)	524 (53.74)	975	
Year				< 0.001
2010	841 (29.88)	1,974 (70.12)	2,815	
2011	833 (33.92)	1,623 (66.08)	2,456	
2012	1,016 (38.70)	1,609 (61.30)	2,625	
2013	709 (36.28)	1,245 (63.72)	1,954	
Sex				< 0.001
Male	2,532 (32.56)	5,244 (67.44)	7,776	
Female	867 (41.80)	1,207 (58.20)	2,074	

Table II. Estimates of the proportion of successful return to work with 95% confidence interval (95% CI)

Variable	Coefficients (SE)	Proportion of success	95% CI
Cause of injury			
Commuting accident	0.16 (0.04)	69.24	67.74–70.71
Occupational disease	0.10 (0.17)	68.01	60.44–74.75
Workplace injury	0.14 (0.05)	68.88	66.69–70.99
Others	−0.46 (0.06)	54.74	51.88–57.56
Injury type			
Lower limbs	0.04 (0.04)	66.94	65.12–68.72
Diseases	−0.68 (0.09)	49.24	44.70–53.80
Upper limbs	0.53 (0.05)	77.11	75.13–79.00
General injuries	−0.14 (0.07)	62.64	59.30–65.87
Multiple locations	−0.33 (0.07)	57.96	54.70–61.15
Employer interest			
Not interested	−1.60 (0.04)	30.00	28.52–31.53
Interested	1.48 (0.03)	98.47	98.00–99.11
Motivation			
Not motivated	−1.74 (0.15)	25.03	19.89–30.98
Motivated	0.10 (0.01)	67.93	67.54–68.32
Intervention period			
≤ 3 months	0.27 (0.04)	71.51	70.01–72.98
4–5 months	−0.03 (0.05)	64.97	62.62–67.26
≥ 6 months	−0.27 (0.04)	59.27	57.45–61.06
Age			
≤ 29 years	0.10 (0.04)	67.76	65.81–69.66
30–39 years	0.03 (0.04)	66.28	64.39–68.12
40–49 years	−0.03 (0.05)	64.84	62.75–66.87
≥ 50 years	−0.33 (0.09)	57.76	53.63–61.80
Sex			
Male	0.03 (0.01)	66.12	65.47–66.77
Female	−0.10 (0.06)	63.14	60.58–65.63
Year			
2010	0.13 (0.05)	68.55	66.50–70.52
2011	0.05 (0.05)	66.72	64.47–68.90
2012	−0.23 (0.05)	60.06	57.85–62.24
2013	0.06 (0.06)	66.84	64.35–69.24

SE: standard error.
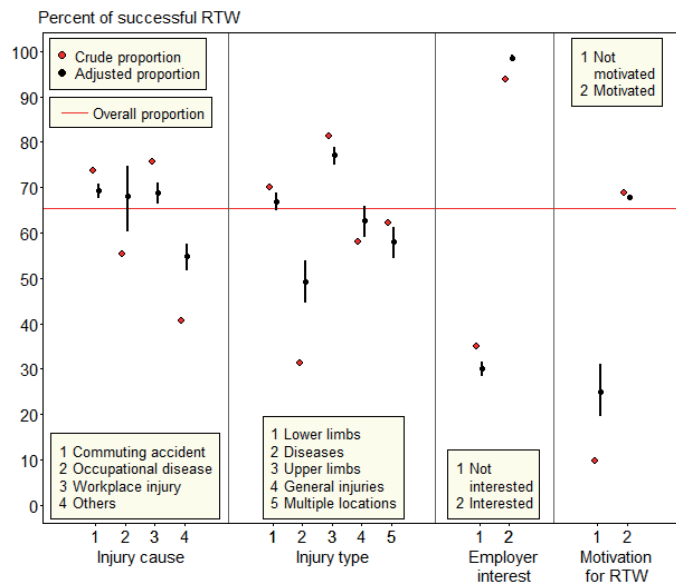
Fig. 1. The 95% confidence intervals for proportion of successful return to work (RTW) by injury cause, injury type, employer interest and motivation.

dence intervals (95% CI) using logistic regression with weighted sum contrasts. The coefficients and standard errors give the same meaning as standard logistic regression (treatment contrast). The difference lies in the baseline category, which is the overall proportion, rather than a reference category.

The coefficient for each category is the difference between the logit proportion of adverse outcomes for that category and the logit for overall proportion after adjustment for intercept bias. The standard errors that result when a logistic regression model is fitted using weighted sum contrasts are used to obtain confidence intervals for logit proportions after adjustment for intercept bias. Thus, we get the confidence intervals for logit proportions and then invert them to get confidence intervals of proportion.

The crude estimates and the adjusted 95% CI for all the covariates are plotted as shown in Figs 1 and 2 with the overall proportion of successful RTW represented by the horizontal line. In terms of the cause and type of injury, it is clear that the proportion of successful RTW was significantly higher than the overall proportion of workers who had had commuting accidents followed by workplace injury, and among those with injuries in the lower and upper limbs. Successful RTW was significantly higher among workers whose employers were interested in hiring disabled workers and among those who were motivated to participate in the intervention programme (Fig. 1). It can be observed from

Fig. 2 that the CI for the year 2010 lies above the overall proportion, while the opposite is true for the CI in 2012. This is somewhat surprising and could be due to differences in the screening of the injured workers for the rehabilitation programme. The gap between the lower and upper bound for male employees is very narrow and its confidence interval lies just over the horizontal line, while for the female employees, its CI is below the overall proportion. The proportion of successful return to work decreased with increasing duration of intervention and increasing age. Fig. 2 also shows that the CIs for the duration of the intervention of at least 6 months and for workers aged at least 50 years are well below the horizontal line.

DISCUSSION

This study estimated the proportion of successful RTW using the logistic regression model with weighted sum contrasts. The analysis was based on secondary data obtained from the SOCSO RTW database. Since inception, the SOCSO RTW programme has had a mean of 1,200 participants annually, and more than 13,000 insured persons have returned to gainful employment by the end of 2015 (23). The overall proportion of successful return to employment was 65.5%, suggesting that there is room for improvement.

There were variations in the proportion of successful return to work across the different categories of the
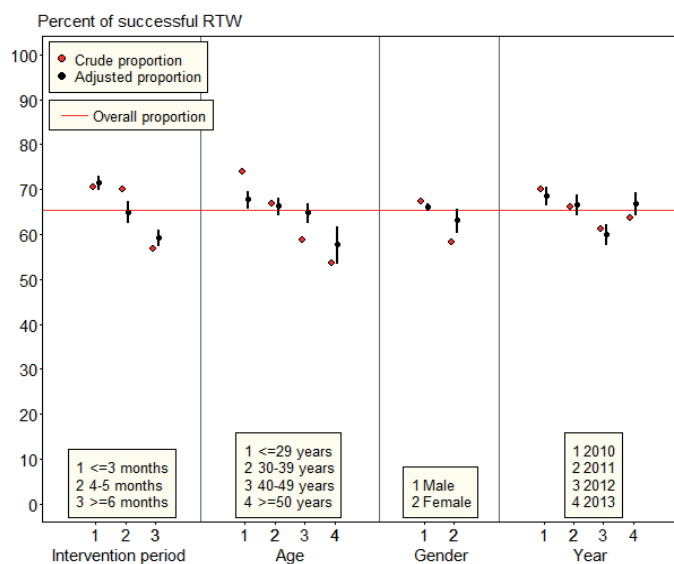
Fig. 2. The 95% confidence intervals for proportion of successful return to work (RTW) by intervention period, age, sex and year of injury.

independent variables in comparison with the overall proportion.

The proportion of injured workers who successfully returned to work was highest among those undergoing intervention within 3 months and decreased with increasing duration. It would be reasonable to assume that the duration of intervention and rehabilitation depends highly on the severity of the injury, the commencement of the intervention, and the response to the treatment received by the injured workers. Prompt intervention is paramount to a speedy recovery, as it has been shown that injured workers' likelihood of returning to employment reduces with increasing duration of absence from work (24).

The majority of injured workers were male and those male workers who participated in the RTW programme registered a higher proportion of successful return to employment compared with female workers. While the finding is consistent with previous studies (13, 25–27), it should be noted that the proportion of female injured workers in this database was much lower that male workers. This is due to the fact that injuries commonly occurred in the manufacturing, construction and technical jobs, which had more males than females. The proportion of successful return to work decreased with increasing age confirms some of the earlier findings (13, 27–29). It was argued that older injured workers take longer to recover from injury and that some of those in the older age group might consider an early retirement, although there were older workers who were hired by employers to perform light duties and share their skills with the young workers (13).

Injury resulting from commuting accidents topped the list of injured workers undergoing the RTW programme compared with the workplace injury, occupational diseases, and others. However, the success rate was slightly higher among workers with workplace injury than commuting accidents and occupational diseases. In term of injury location, workers with upper and lower limbs injury had a higher proportion of successful return to employment compared with those with general and multiple injuries. While it is reasonable to argue that the recovery rate for limb injuries would be higher and faster compared with injuries in other locations, the data did not include the nature and severity of these injuries. This study showed that: the proportion of successful return to work was substantially higher among motivated participants compared with among those who were not motivated; employer interest in re-hiring injured or disabled workers contributed significantly to the success of the RTW programme. It is important to note that a great majority of the RTW participants were motivated to participate in the intervention programme, while interested employers would probably want to re-employ their valued employees as soon as they possibly can to avoid further loss of productivity and other related payments. It has also been shown that the economic gain of such a programme outweighs the costs involved (30).

Study limitations

A limitation of this study includes the large number of cases that were excluded due to incomplete information on important variables related to injury, such as the type of injury. However, missing values on the dependent and the other independent variables were less than 5%, except for injury type and industry sector. There were no signs of a systematic tendency in the missing cases. While it may reduce the power of testing, it has not caused bias in the estimation of the regression coefficients. There were also missing values for participants' background information, including educational qualification, marital status, job positions and working experience, resulting in these variables being excluded from the analysis.

Conclusion

The study has shown that a structured multidisciplinary intervention programme provides a positive outcome in returning to work as measured by the proportion of successful return to employment. Related factors have various impacts on successful return to the workforce. Successful return was positively associated with commuting accidents, workplace injuries, injuries of the lower and upper limbs, interested employers, motivated participants, intervention within 3 months, and age 29 years or younger. Negatively related factors were illness/diseases, multiple locations of injury, uninterested employers, unmotivated participants and longer duration of intervention, older age, and female participants.

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