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Impacts of Return-to-Work Type and Period on Job Retention in Workers with Occupational Injuries and Diseases

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ABSTRACT

Background: Despite the necessity of job retention in achieving return-to-work (RTW) goals, many workers leave their jobs after returning to work. The objective of this study was to examine the impacts of RTW type and period on job retention in Korean workers with occupational injuries and diseases.
Methods: Data were derived from the Panel Study of Worker's Compensation Insurance, including data from 2,000 systemically sampled workers who had finished recuperation in 2012; three waves of survey data were included in the analyses. Workers who returned to work (n = 1,610) were included in the analysis of the relationship between RTW type and job retention, and 664 workers who returned to their original workplaces were included in the analysis of the relationship between RTW period and job retention. The participants completed a questionnaire, and administrative data were provided by workers' compensation insurance.
Results: A Cox proportional-hazards regression analysis showed an increased hazard ratio (HR) for non-retention of 2.66 (95% confidence interval, 2.11–3.35) in reemployed workers compared to that in workers returning to their original workplaces. Among workers returning to their original workplaces, HRs for non-retention were increased in workers with a RTW period of 13–24 months (3.03 [1.52–6.04]) and > 24 months (5.33 [2.14–13.25]) compared to workers with a RTW period of ≤ 3 months.
Conclusion: RTW type and period were significantly related to job retention, suggesting that policies for promoting job retention rate should be implemented.

Keywords: Occupational Injuries; Occupational Diseases; Return-to-Work; Workers' Compensation; Workplace; Occupational Health

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Disclosure
The authors have no potential conflicts of interest to disclose.

Author Contributions
Conceptualization: Jeong I, Yoon JH, Won JU, Roh J. Formal analysis: Jeong I, Yoon JH. Writing - original draft: Jeong I, Park JB, Kim HR, Won JU. Writing - review & editing: Jeong I, Park JB, Kim HR, Yoon JH, Won JU, Roh J.

INTRODUCTION

Since 2001 in Korea, the annual number of workers with occupational injuries and diseases has been greater than 80,000, rising to more than 90,000 since 2007, despite a consistent decline in the rate of occupational injuries and diseases over the last ten years (7.69‰ in 2006 and 5.02‰ in 2015).[1] To prevent and reduce the negative effects of occupational injuries and diseases, many studies have focused on workers with occupational injuries and accidents. As preventing occupational injuries and accidents is the most effective solution to prevent negative impacts,[2] many studies have focused on factors potentially affecting the occurrence of occupational injuries and diseases. On the other hand, returning to work after recuperation can also help to reduce and prevent negative effects after occupational injuries and accidents have occurred.[3,4] Therefore, the Korea Workers' Compensation and Welfare Service (KCOMWEL), which operates workers' compensation insurance in Korea, has taken an interest in return-to-work (RTW), which is defined by re-entry to work after occupational injuries and diseases, and has developed several programs promoting RTW. As a result, the RTW rate in Korea increased from 49.5% in 2010 to 56.8% in 2015.[5]

However, previous studies reported that many workers leave their jobs after RTW;[6-8] and studies targeting Korean workers reported that approximately 33% to 60% of workers left their jobs after the first RTW.[9,10] These results imply that RTW does not essentially guarantee job retention. Therefore, to fully understand RTW, it is necessary to investigate the post-RTW situation of returned workers.

A previous study on RTW suggested that the broad meaning of RTW consists of four phases: off work, re-entry, retention (or maintenance), and advancement.[11] Therefore, to achieve the goals of RTW, retention must be properly accomplished after RTW. However, only a few studies focused on job retention along with RTW, and definitions of RTW varied across studies.[12,13] Moreover, as national statistics in Korea provide information only on RTW, there is a lack of understanding of job retention in Korea.

In previous studies on job retention, although a few studies targeted patients with occupational accidents, most studies have examined sociodemographic and work-related factors, which are reportedly related to RTW. Factors with significant relationships to job retention included sociodemographic factors such as age, sex, and education level; and work-related factors such as occupational prestige, work characteristics, working environment, and length of service.[10,14,15] In contrast, duration of treatment or sickness absence were also considered as predictors of RTW.[16-18] Since there are benefits of early RTW, such as rehabilitation, cost, and income, many countries have introduced policies for promoting early RTW.[19-21] However, there is a lack of studies on the association between early RTW and job retention. Additionally, studies regarding the association between RTW type (whether workers returned to their pre-accident workplaces or were reemployed) and job retention are lacking. Therefore, the objective of this study was to examine the impacts of RTW type and period, which are modifiable factors, on job retention in Korean workers with occupational injuries and diseases.

METHODS

Panel Study of Worker's Compensation Insurance (PSWCI)

The PSWCI is conducted by the Labor Welfare Research Center of KCOMWEL for policy development and service evaluation. The target population of the current study comprised

89,921 workers who had finished recuperation by workers' compensation in 2012. Among them, 73 workers with unknown addresses, five workers with disability ratings of 1–3 and who did not utilize rehabilitation services, and 7,350 foreigners and Jeju island residents were excluded. Of the remaining 82,493 workers, 2,000 were selected by stratified systematic sampling. Administrative district, disability rating, and rehabilitation service utilization status were used as stratification variables. Selected panels were interviewed by trained interviewers in a one-on-one interview; to minimize interviewer errors, the computer-assisted personal interviewing method was applied. The interview was conducted on an annual basis, and the first interview was carried out on 2013. In this study, three waves of survey data (from 2013 to 2015) were used, and 1,610 workers who returned to paid work were included in the analyses.

Main outcome variables

In the survey, the workers' employment status was investigated yearly. If a worker's outcome of the first RTW was paid work (excluding self-employment), then the worker was included in the study. RTW type was determined according to whether or not there was a post-accident change of workplace, with categorization into an original workplace group and a reemployed group.

Along with employment status, time of return and time of leaving (only if the worker left work) were also investigated; these data were used to calculate the follow-up period. The RTW period was defined by the time from accident to RTW and was investigated only in workers who returned to their original workplaces; workers were divided into six groups based on the RTW period; however, workers who returned to work before the end of recuperation were excluded. Finally, the workers were divided into two groups: the job retention and the non-retention groups. The job retention group included workers who maintained the first job after occupational injuries and diseases during follow-up period, and the non-retention group included workers who left the first job after occupational injuries and diseases during the follow-up period.

Covariates

The workers' sociodemographic, job-related, and accident-related factors were used as covariates. Age was divided into five categories by decades starting from younger than 30 then going up to 60 years or older. Education level was divided into three categories with less, equal, or more than high school education (12 years). Type of industry was classified based on the Korean Standard Industrial Classification and was divided into manufacturing, construction, and others, because manufacturing and construction together account for more than half of total cases. Type of occupation was investigated based on the Korean Standard Classification of Occupations and divided into three groups based on nature of occupation (white collar, blue collar, and service workers). Perceived health status was decided based on an answer from the worker's self-rated health status question.

Data on recuperation period, disability severity, and rehabilitation service (which KCOMWEL provides) utilization status were obtained from the workers' compensation insurance administrative database. The recuperation period was divided into three categories (≤ 6 months, 7–12 months, and > 12 months). Disability ratings according to the Industrial Accident Compensation Insurance Act consist of 14 grades; smaller numbers indicate more severe disability. In this study, grades were divided into five categories of severe (1–7), moderate (8–10), mild (11–12), minimal (13–14), and no grade. Moreover, workers were asked

"Have you ever had a chance to consult with a doctor about RTW during treatment?" and "Did you keep in touch (hospital visit or phone call) with your employer or human resources manager during recuperation?"; answers regarding RTW consultation and maintenance of a relationship with the employer signified physician- and employer-related factors, respectively.

Statistical analysis

To compare subject characteristics by job retention status, t-tests for continuous variables and χ^2 tests for categorical variables were used. Hazard ratios (HRs) and 95% confidence intervals (CIs) were estimated using Cox proportional-hazards models. The Kaplan-Meier method was used to estimate survival curves, and the log-rank test was used to compare retention probability between groups. All statistical tests were two-tailed, and *P* values less than 0.05 were regarded as statistically significant. All statistical analyses were conducted with the SAS software package version 9.4 (SAS Institute, Cary, NC, USA).

Ethics statement

The Institutional Review Board of Yonsei University Health System reviewed its protocol and approved this study (Y-2017-0017). Informed consent was waived by the board.

RESULTS

Among the 1,610 workers, 468 (29.1%) workers left their jobs during the follow-up period. The mean follow-up periods for the job retention and non-retention groups were 28.6 (± 11.7) and 15.5 (± 8.9) months, respectively. In univariate analyses, distributions of sex, education level, occupation, accident type, RTW consultation, maintenance of relationship with employer, and RTW type showed significant differences between the two groups. Male workers, workers with an education level of college or above, white- and blue-collar workers, workers with occupational diseases, workers who had chances to consult with their doctors about RTW, workers who maintained a relationship with their employers, and workers who returned to their original workplaces were more likely to retain their jobs after RTW. However, distributions of age, industry, perceived health status, recuperation period, disability severity, and rehabilitation service utilization status did not show significant differences between the two groups (**Table 1**).

Kaplan-Meier survival curves showed a significant difference in job retention probability between the original workplace group and the reemployed group ($P < 0.001$ by log-rank test), with a higher retention rate in the original workplace group (**Fig. 1**). In the Cox proportional-hazards regression analysis, the hazard for non-retention was significantly higher in the reemployed group compared to that in the original workplace group, with HRs of 2.97 (95% CI, 2.43–3.63) in the crude model and 2.66 (2.11–3.35) in the adjusted model (**Table 2**).

To examine the impact of RTW period on job retention, six hundred and sixty-four workers in the original workplace group were divided according to job retention status. The job retention rate in the original workplace group was 80.3%, with 131 workers leaving work during the follow-up period. The mean follow-up period was 34.0 (± 9.2) months in the job retention group and 19.2 (± 8.4) months in the non-retention group. In the univariate analysis, distributions of sex, education level, occupation, and RTW period were significantly different between the two groups. Male workers, workers with higher education levels,

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Table 1. General characteristics of study subjects by job retention status

Characteristics	Job retention (n = 1,142)	Non-retention (n = 468)	*P* value
Follow-up period, mon	28.6 ± 11.7	15.5 ± 8.9	< 0.001
Age, yr			0.067
< 30	58 (63.7)	33 (36.3)	
30–39	188 (73.2)	69 (26.9)	
40–49	334 (73.6)	120 (26.4)	
50–59	411 (71.5)	164 (28.5)	
≥ 60	151 (64.8)	82 (35.2)	
Sex			0.007
Male	989 (72.2)	380 (27.8)	
Female	153 (63.5)	88 (36.5)	
Education level			0.005
Less than high school	391 (66.4)	198 (33.6)	
High school	545 (72.6)	206 (27.4)	
College or above	206 (76.3)	64 (23.7)	
Industry			0.059
Manufacturing	468 (74.3)	162 (25.7)	
Construction	300 (69.0)	135 (31.0)	
Others	374 (68.6)	171 (31.4)	
Occupation			0.005
White collar	117 (72.7)	44 (27.3)	
Blue collar	958 (71.9)	375 (28.1)	
Service	67 (57.8)	49 (42.2)	
Perceived health status			0.080
Good	714 (72.6)	270 (27.4)	
Bad	428 (68.4)	198 (31.6)	
Accident type			0.020
Injury	1,034 (70.1)	441 (29.9)	
Disease	108 (80.0)	27 (20.0)	
Recuperation period, mon			0.635
≤ 6	694 (71.0)	283 (29.0)	
7–12	361 (70.0)	155 (30.0)	
> 12	87 (74.4)	30 (25.6)	
Disability severity			0.312
Severe	37 (72.6)	14 (27.5)	
Moderate	203 (74.1)	71 (25.9)	
Mild	359 (71.8)	141 (28.2)	
Minimal	347 (71.0)	142 (29.0)	
None	196 (66.2)	100 (33.8)	
Rehabilitation service utilization			0.988
Yes	561 (71.0)	229 (29.0)	
No	581 (70.9)	239 (29.2)	
RTW consultation			0.023
Yes	313 (75.4)	102 (24.6)	
No	829 (69.4)	366 (30.6)	
Maintenance of a relationship with employer			< 0.001
Yes	775 (74.0)	272 (26.0)	
No	367 (65.2)	196 (34.8)	
RTW type			< 0.001
Original workplace	575 (80.2)	142 (19.8)	
Reemployed	567 (63.5)	326 (36.5)	

Data are shown as mean ± standard deviation or number (%).
RTW = return-to-work.

white- and blue-collar workers, and workers with a shorter RTW period were more likely to be included in the job retention group. However, distributions of age, industry, perceived health status, accident type, disability severity, rehabilitation service utilization status, RTW consultation, and maintenance of a relationship with the employer were not significantly different between the two groups (**Table 3**).

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Table 2. Cox proportional-hazards ratios for leaving the job by RTW type

RTW type	No.	Crude		Adjusted[a]	
		HR	95% CI	HR	95% CI
Original workplace	717	1.00		1.00	
Reemployed	893	2.97	2.43–3.63	2.66	2.11–3.35

RTW = return-to-work, HR = hazard ratio, CI = confidence interval.
[a]Adjusted for age, sex, education level, industry, occupation, perceived health status, accident type, recuperation period, disability severity, rehabilitation service utilization, RTW consultation, and maintenance of a relationship with employer.

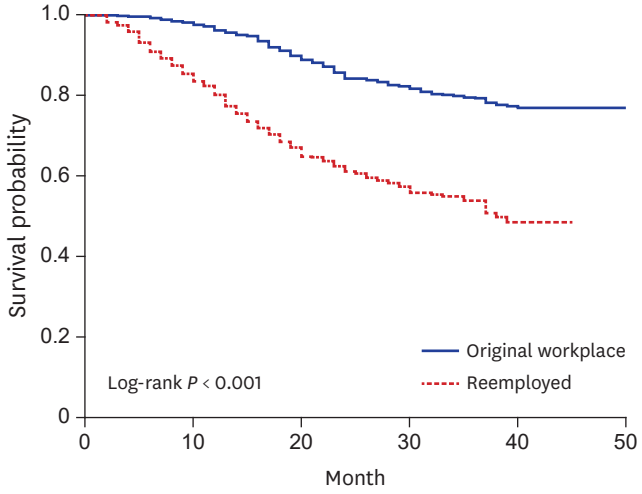


Fig. 1. Kaplan-Meier survival curves for job retention stratified by RTW type.
RTW = return-to-work.

In the crude model of Cox proportional-hazards regression analysis, workers with a RTW period of 13–24 months and more than 24 months were more likely to leave their jobs compared to workers with a RTW period of 3 months or less, with HRs of 2.27 (1.22–4.22) and 3.48 (1.57–7.70), respectively. Moreover, in the adjusted model, workers with a RTW period of 13–24 months (3.03 [1.52–6.04]), and more than 24 months (5.33 [2.14–13.25]) were more likely to leave their jobs compared to workers with a RTW period of 3 months or less. HRs for non-retention were not significantly different compared to workers with a RTW period of 3 months or less among workers who returned within 4–6 months, 7–9 months, and 10–12 months in both models (**Table 4**).

DISCUSSION

In this study, the authors investigated impacts of RTW type and period on job retention. To the best of the authors' knowledge, this is the first such study focusing on Korean workers. The HR for non-retention was 2.66 (2.11–3.35) after adjustment among workers who changed their workplaces for any reason following occupational injuries and diseases compared to workers who returned to their original workplaces. Additionally, workers with a RTW period of 13–24 months and more than 24 months had significantly higher HRs compared to the workers with a RTW period of 3 months and less (3.03 [1.52–6.04] and 5.33 [2.14–13.25], respectively).

After recuperation, only less than half of the workers (44.5%) returned to their original workplaces in this study, and the proportion of workers who were reemployed was higher than in other previous studies in Korea. The difference occurred due to methodological

Table 3. General characteristics of workers who returned to their original workplace by retention status

Characteristics	Job retention (n = 533)	Non-retention (n = 131)	*P* value
Follow-up period, mon	34.0 ± 9.2	19.8 ± 8.4	< 0.001
Age, yr			0.249
< 30	20 (66.7)	10 (33.3)	
30–39	105 (81.4)	24 (18.6)	
40–49	170 (82.5)	36 (17.5)	
50–59	179 (81.0)	42 (19.0)	
≥ 60	59 (75.6)	19 (24.4)	
Sex			0.028
Male	459 (81.8)	102 (18.2)	
Female	74 (71.8)	29 (28.2)	
Education level			0.022
Less than high school	142 (74.0)	50 (26.0)	
High school	279 (81.8)	62 (18.2)	
College or above	112 (85.5)	19 (14.5)	
Industry			0.155
Manufacturing	278 (83.2)	56 (16.8)	
Construction	62 (77.5)	18 (22.5)	
Others	193 (77.2)	57 (22.8)	
Occupation			0.003
White collar	73 (83.0)	15 (17.1)	
Blue collar	432 (81.5)	98 (18.5)	
Service	28 (60.9)	18 (39.1)	
Perceived health status			0.130
Good	388 (81.9)	86 (18.1)	
Bad	145 (76.3)	45 (23.7)	
Accident type			0.153
Injury	466 (79.4)	121 (20.6)	
Disease	67 (87.0)	10 (13.0)	
RTW period, mon			0.031
≤ 3	84 (81.6)	19 (18.5)	
4–6	232 (84.4)	43 (15.6)	
7–9	112 (81.2)	26 (18.8)	
10–12	39 (75.0)	13 (25.0)	
13–24	49 (70.0)	21 (30.0)	
> 24	17 (65.4)	9 (34.6)	
Disability severity			0.961
Severe	22 (84.6)	4 (15.4)	
Moderate	86 (80.4)	21 (19.6)	
Mild	160 (80.4)	39 (19.6)	
Minimal	171 (80.7)	41 (19.3)	
None	94 (78.3)	26 (21.7)	
Rehabilitation service utilization			0.920
Yes	239 (79.9)	60 (20.1)	
No	294 (80.6)	71 (19.5)	
RTW consultation			0.652
Yes	168 (81.6)	38 (18.5)	
No	365 (79.7)	93 (20.3)	
Maintenance of a relationship with employer			0.736
Yes	472 (80.6)	114 (19.5)	
No	61 (78.2)	17 (21.8)	

Data are shown as mean ± standard deviation or number (%).
RTW = return-to-work.

differences, because RTW status was investigated cross-sectionally in previous studies, whereas it was investigated longitudinally in this study. Consequently, overall RTW rate in this study was higher and the ratio between workers who returned to their original workplaces and workers who were reemployed was different compared to the previous studies.[16,22,23]

Table 4. Cox proportional-hazards ratios for leaving the job by RTW period

RTW period, mon	No.	Crude	Adjusted[a]
		HR (95% CI)	HR (95% CI)
≤ 3	103	1.00	1.00
4–6	275	0.85 (0.50–1.46)	0.96 (0.53–1.73)
7–9	138	1.11 (0.61–2.01)	1.50 (0.77–2.92)
10–12	52	1.62 (0.80–3.27)	2.10 (0.96–4.59)
13–24	70	2.27 (1.22–4.22)	3.03 (1.52–6.04)
> 24	26	3.48 (1.57–7.70)	5.33 (2.14–13.25)

RTW = return-to-work, HR = hazard ratio, CI = confidence interval.
[a]Adjusted for age, sex, education level, industry, occupation, perceived health status, accident type, disability severity, rehabilitation service utilization, RTW consultation, and maintenance of a relationship with employer.

Reemployed workers were more likely to leave their jobs than the workers who returned to their original workplaces. In a previous study targeting Korean workers, workers returned to their original workplaces were less likely to leave their jobs (HR, 0.355), which is similar to the results from the present study.[10] One possible explanation for this is that in Korea, KCOMWEL provides support funds to employers during the period from six to 12 months after workers return to work.[24] On the contrary, there are no protection policies for reemployed workers who have previously suffered occupational injuries and diseases, nor are there inducements for employers to employ and maintain the employment of such workers. This may have affected the results showing that reemployed workers have higher hazards for non-retention compared to workers who returned to their original workplaces. Another possible explanation is that reemployed workers experienced difficulties in adaptation — in support of this, in the first survey, while 49.5% of workers who returned to their original workplaces responded that there were no obstacles in adaptation after RTW, only 20.9% of workers who were reemployed responded that there were no obstacles. The major obstacle was physical disability for both groups (44.7% and 44.3% for the original workplace group and the reemployed group, respectively), however, the proportions of workers who responded that unfamiliar work (0.3% and 8.0%) or new organizational atmosphere (0.5% and 10.9%) were obstacles in adaptation showed differences.[25] However, since the impact of factors reported as related to return to the original workplace such as number of employee, employment duration, and industry type was not examined in this study, there is a need to investigate factors related to return to the original workplace in future studies.[16]

HRs for non-retention were significantly higher among workers with a RTW period of more than 12 months. Although the relationship between RTW period and job retention is not well understood, there are possible explanations supporting the relationship. First, a previous study reported that workers who were hospitalized for more than 6 months were more likely to have lower willingness to RTW.[26] In addition, another study suggested that workers with longer treatment duration were less likely to RTW due to the higher severity of disability.[16] Although the results only explain the relationship between treatment duration and RTW, it is possible that the lower willingness and higher severity of disability affected job retention in the same way.

In previous studies targeting Korean workers with work-related injuries and diseases, it was reported that workers with a treatment duration of 6 months or more were less likely to return, with an odds ratio (OR) of 0.33, compared to workers with a treatment duration of less than 3 months; it was also reported that workers with a treatment duration of 6 months or less were more likely to return to paid work compared to workers with a treatment duration of more than 3 years (ORs of 1.19 and 2.27 for pre-injury job and new firm, respectively).[16,22] Although the outcomes of these studies were different from that of the

current study (re-entry vs. retention, respectively), the results can be regarded as consistent, since the broad meaning of RTW includes both re-entry and retention. Furthermore, there was a difference in the definition and length of duration that was shown to be significantly related to RTW. This is partially explained by methodological differences in that the previous studies included only the recuperation period. In the present study, the RTW period was used rather than the recuperation period. Since the recuperation period is determined by the workers' compensation insurance, some workers cannot return to work at the end of the recuperation period. In support of this, about 95% of workers with a delay in RTW responded that the delay occurred because of problems with health or recovery in the first survey.[25] Therefore, period of delay in RTW after recuperation should be considered along with the recuperation period, to provide more accurate results, since the delay can be regarded as a part of sickness absence.

Employment status is positively associated with health;[27] similarly, RTW affects individuals and society and therefore is often considered as an important and final goal in rehabilitation.[28] For a successful RTW, it is widely accepted that returning to the same employer is a higher priority than returning to a different employer.[29] The current results provide evidence concerning the priority of RTW. Moreover, this study estimates the effect of RTW period for job retention in workers with occupational injuries and diseases.

This study has certain strengths. First, as panels of this study were systematically sampled from all workers who had finished recuperation from occupational injuries and diseases, the results can be regarded as being representative of the Korean working population. Second, the panel data were collected prospectively, minimizing the possibility of recall bias or reverse causation.

There are also limitations in this study to consider when interpreting the results. First, there was no information on the diagnosis of the workers, the effect of individual disease entities on job retention and any differences among the disease entities could not be evaluated. Moreover, as there was a lack of homogeneity of severity among the workers, this could have acted as a confounder. To overcome this limitation, the disability rating was used as an alternative to adjust the severity, since disability rating is based on loss of labor capacity.[30] Second, panels were planned to be surveyed for 5 years; however, as this study was conducted in the middle of the 5-year period, only the first three waves of data could be used. However, although the follow-up period was rather short, the findings from this study showed distinct differences according to RTW type and period; nevertheless, a longer follow-up period would provide stronger conclusions.

In conclusion, workers who were reemployed after occupational injuries and diseases and with a prolonged RTW period of more than 12 months are at high risk for non-retention. Therefore, policies encouraging returning to the original workplace, protecting reemployed workers, and promoting early RTW should be implemented. Furthermore, additional studies with a longer follow-up period and consideration of common disease entities are needed.

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