Durations of first and second periods of depression-induced sick leave among Japanese employees: the Japan sickness absence and return to work (J-SAR) study

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Abstract: This study aimed to clarify the difference between the durations of first and second periods of depression-induced sick leave and to identify predictors of a prolonged second period of depression-induced sick leave. Among Japanese employees who were registered in the Japan sickness absence and return to work (J-SAR) study, the subjects were those employees who returned to work after an initial period of depression-induced sick leave (F3; ICD-10, based on a psychiatrist's certificate), and returned to work after a second period of depression-induced sick leave. The subjects' second periods of sick leave (mean: 156.9 d) were longer than their first periods of sick leave (107.3 d) (Wilcoxon test, *p*=0.007). In the logistic regression analysis (Table 2), "longer duration of the first period of sick leave" (Odds ratio: 3.258, 95%CI: 1.780–5.963, *p*<0.001) was identified as a significant predictor of a longer recurrent period of sick leave. Individuals who experience a long initial period of depression-induced sick leave should be supported carefully by occupational health professionals after they RTW.

Key words: Depression, Sick leave, Recurrent sick leave, RTW (return to work), OP (occupational physicians)

Introduction

Mental health problems are important issues for occupational health services. Depression is known to cause

negative work outcomes, including sick leave (i.e., loss of work productivity)[1–3]. In recent decades, the incidence of sick leave due to mental disorders has been increasing globally[4–6]. In Japan, about 60% of workers suffer from marked anxiety or stress in their occupational lives, possibly due to the severe economic recession experienced by the country[7]. A recent Japanese study showed that mental disorders were the most frequent cause of sick leave, fol-

Table 1. Basic characteristics of the study subjects (n=214)

(n=214)	Mean ± SD	Median	n	Duration of first sick leave	Duration of recurrent sick leave
				Mean (SE), d	Mean (SE), d
Age at the day of first sick leave, yr	40.6 ± 8.0	41			
≤41			119	106.8 (11)	177.1 (22)
42≤			95	107.9 (11)	131.6 (21)
Sex					
Male			185	100.4 (7)	145.0 (15)
Female			29	151.5 (41)	232.3 (56)
Age at entering the company, yr	19.9 ± 9.9	22			
≤22			137	114.1 (11)	142.6 (18)
23≤			66	100.6 (11)	193.5 (32)
Living with family or alone					
Living with family			158	102.2 (9)	166.2 (20)
Living alone			52	117.9 (16)	117.5 (18)
Time for commuting, min	68.5 ± 28.0	60			
≤60			107	107.3 (9)	164.7 (22)
61≤			99	105.1 (14)	147.0 (22)
Manager/ Non-manager					
Non-manager			179	93.5 (12)	158.7 (39)
Manager			34	110.0 (9)	156.7 (17)
Total			214	107.3 (8)	156.9 (15)

Table 2. Logistic regression analysis for duration of the second period of sick leave

Variables	Univariable analysis	Multivariable analysis
	Odds ratio (95% CI)	Odds ratio (95% CI)
Age at the day of the first sick leave		
≤41 (yr) (ref)	1	1
42≤ (yr)	0.664 (0.386–1.142)	0.673 (0.347–1.304)
Sex		
Male (ref)	1	1
Female	1.218 (0.554–2.673)	1.359 (0.550–3.358)
Age at entering the company, yr		
≤22 (yr) (ref)	1	1
23≤ (yr)	1.455 (0.806–2.627)	1.548 (0.764–3.134)
Living with family/alone		
Living with family (ref)	1	1
Living alone	0.699 (0.372–1.312)	0.637 (0.309–1.314)
Time for commuting		
≤60 (min) (ref)	1	1
61≤ (min)	0.968 (0.560–1.672)	0.919 (0.505–1.673)
Manager (ref: non-manager)		
Non-manager (ref)	1	1
Manager	1.708 (0.806–3.621)	1.958 (0.822–4.667)
Duration of the first sick leave		
≤87 (d) (ref)	1	1
88≤ (d)	2.807 (1.613–4.884)	3.258 (1.780–5.963)

lowed by cancer[8]. In Japan, after the publication of the "Guidelines for the return to work of sick-listed employees due to mental health problems" by the Ministry of Health, Labor, and Welfare in 2012, many large-scale companies have developed a growing interest in the return to work (RTW) of employees with mental disorders[9, 10].

Although only limited data are available, depression has been shown to have a high recurrence rate after patients RTW in Western countries[11, 12]. Mueller *et al.* reported that about 85% of people who recovered from major depressive disorder suffered a recurrent episode within 15 yr[11]. Mattisson *et al.* found that about 40% experienced recurrent depression[13]. Other studies have demonstrated that the cumulative sick leave rate due to recurrent depression was about 50%[14, 15]. Another problem with recurrent sick leave due to depression is that the associated illness is often serious and results in more long-lasting sick leave than the initial episode[16]. Esposito *et al.* reported in their observational study that employees who returned to work after sick leave due to mental disorders struggle with lower work productivity[17].

Given the huge burden caused by recurrent sick leave due to depression, the development of a strategy for preventing such recurrence is urgently required. In previous studies, however, little attention has been paid to the prevention of recurrent sick leave due to depression[18, 19]. Koopmans *et al.*[14] reported that employees who experienced sick leave due to mental disorders were at high risk of recurrent sick leave and suggested that relapse prevention consultations should be continued for three years after the RTW of such individuals. Another study by Arends *et al.*[16] reported that a company size of >100 workers and conflicts with superiors were associated with a high risk of recurrent sick leave. However, while some previous studies have investigated predictors of recurrent sick leave due to mental disorders, few studies have examined the duration of such sick leave[5, 16]. In this study, we aimed to expand the current knowledge about this topic by (1) clarifying the difference between the durations of the initial period of depression-induced sick leave and the second period of depression-induced sick leave and (2) analyzing the predictors of the duration of the second period of depression-induced sick leave using a large dataset relating to Japanese workers.

Methods

The Japan sickness absence and return to work study (J-SAR study) was a retrospective, observational cohort study conducted in Japan. The J-SAR study analyzed data regarding sick leave that were registered in the health data system of a private occupational health center, which belongs to a large-scale Japanese company group (it includes telecommunications, logistics, energy, and construction companies). About 68,000 employees were working for these companies on a full-time basis. We have reported some studies of the J-SAR study data previously[5, 15, 20–22]. The large companies involved in the J-SAR study all used the same well-established sick leave system, which was associated with their occupational physician (OP) contracts. According to this system, employees whose paid leave has been used up and who need to take time off due to mental disorders are requested to submit a psychiatrist's certificate to their superior or the human resources (HR) department to have their sick leave certified. After confirming the content of the certificate, an OP will register the employee's absence as "sick leave", based on the World Health Organization's 10th International Classification of Diseases (ICD-10).

In addition, employees who want to RTW after sick leave due to a mental disorder are required to submit a psychiatrist's certificate stating that they have recovered sufficiently to RTW. In general, the employee will be interviewed by their OP, their superior, and often a person from HR, who will make a judgment about their RTW. After the RTW interview, the OP issues an OP certificate regarding the RTW judgment and the employee's working hours and workplace conditions after they RTW. If the company allows the employee to RTW based on the OP certificate, a partial RTW, workplace accommodations, and/or a reduction in the employee's workload might be considered by their superior. Therefore, the data of the J-SAR study were based on psychiatrists' certificates and the judgments of OP, rather than being self-reported.

Subjects

The inclusion criteria for this study were as follows: individuals who were registered in the J-SAR study and returned to work between April 1, 2002, and March 31, 2008, after their first period of sick leave due to the novel onset of depression (F3; ICD-10, based on a psychiatrist's certificate), and returned to work after their second period of depression-induced sick leave on or before September 30, 2010. These criteria meant that the study population did not include employees who had experienced previous episodes of psychiatric disorders before April 1, 2002, and employees who were absent because of schizophrenia, anxiety disorder, eating disorders, adjustment disorder,

alcohol dependency, or other mental disorders except F3 (ICD-10). In addition, the first period of sick leave was not due to recurrence because employees who had experienced previous episodes of sick leave due to depression before March 31, 2002, were not included in the study. In total, 214 employees satisfied the inclusion criteria (they experienced two episodes of sick leave due to depression and returned to work twice). The medical ethics committee of Juntendo University informed us that ethical approval was not required because the data were existing data that were anonymous and impossible to concatenate, and there was no correspondence table.

Outcome measures and statistical analysis

We compared the durations of the subjects' first and second periods of sick leave using Wilcoxon's test. In order to analyze predictors of the duration of the second period of depression-induced sick leave, we performed logistic regression analysis. Four variables (age at RTW, age at entering the company, time for commuting, duration of the first sickness absence) were dichotomized based on their median scores of the participants. In the logistic regression analysis, the dichotomized duration of the second period of depression-induced sick leave was defined as dependent variables. We defined the following variables as independent ones: age at RTW (which meant 'RTW from 1st depressive episode'), sex, age when entering the company, time for commuting, living with family/alone, manager/non-manager, and the duration of the first period of sick leave. We considered that 'tenure' and 'age at RTW' should not be included in the multivariate analysis, as older RTW employees have a longer tenure. We chose 'age at entering the company' as a variable because we considered that employees who began working at the company at a younger age might be more adaptable after their RTW. We conducted univariate and multivariate analyses of all variables. All statistical analyses were performed using SPSS for Windows, version 24.

Results

The subjects' basic characteristics are shown in Table 1. In this study, 214 employees experienced two periods of depression-induced sick leave and returned to work after each episode. The subjects' median age on the first day of the first period of sick leave was 41 yr old, and 185 (86.4%) subjects were male. The median commuting time (from home to the workplace) was 60 min. The median age when entering the company was 22 yr old. The median durations

of the first and second periods of depression-induced sick leave were 87.5 d and 90 d, respectively. These median values were used for dichotomizing. The second period of sick leave was longer than the first (Wilcoxon's test, *p*-value=0.007). The degree of variance (49,971) in the duration of the second period of sick leave was much greater than the degree of variance (13,323) in the duration of the first period of sick leave. The frequency distribution of the duration of sick leave was heavily skewed to the right. The skewness values of the durations of the first and second periods of sick leave were 4.79 and 3.65, respectively. The kurtosis values of the durations of the first and second periods of sick leave were 32.8 and 15.8, respectively. The mean and median durations of the period from the day on which the employee first returned to work until the first day of the second period of sick leave were 332.4 d and 204 d, respectively.

In the logistic regression analysis (Table 2), "longer duration of the first period of sick leave" (Odds ratio: 3.258, 95%CI: 1.780–5.963, *p*<0.001) was identified as a significant predictor of a longer recurrent period of sick leave. Age on the first day of the first period of sick leave, sex, age at entering the company, living alone/living with family, time for commuting, being a manager/non-manager were not significantly associated with the duration of the second period of sick leave.

Discussion

Depression is known to carry a high risk of recurrence[5, 23]. To the best of our knowledge, this was the first study to use a large register of data regarding medically certified sick leave to analyze and compare the durations of the first and second periods of depression-induced sick leave among Japanese employees. In addition, sick leave due to mental disorders is known to be one of the most costly types of sick leave because of the tendency for such periods of sick leave to be long. Our study showed that the second period of depression-induced sick leave (mean: 156.9 d) was longer than the first period (107.3 d). The distribution of the data regarding the duration of the second period of sick leave was heavily right-skewed, which agrees with a previous study that found that the distribution of sick leave duration data tends to be heavily skewed[24]. In our study, the median duration of the period of work (204 d) from the day on which a subject returned to work after their first period of sick leave until the first day of recurrent sick leave was much longer than was found in a UK study (43 d)[25]. It is not so easy for patients with depression to keep work-

ing after they RTW. The discrepancy between the findings of our study and those of the UK study might have been due to differences in social culture, company size, etc.

Sick leave is a multi-causal phenomenon, in which disorder-related, individual, and occupational factors are intertwined in a complex manner[26–28]. Sick leave; i.e., when a worker cannot stay at work due to a physical or mental condition, has a significant and long-lasting impact on workers, their families, companies, and society[29]. While employees tend to be regarded as having totally recovered from their illness at the time of their RTW, their ability to work has just recovered to a level where it is possible for them to RTW. After RTW, some depressed employees might experience recurrent episodes of sick leave, while others stay at work[30]. As work becomes more mentally demanding, it is expected that the duration of sick leave due to mental disorders will increase[31, 32]. There is little data regarding the duration of sick leave due to mental disorders[33, 34]. Various levels of symptom severity have been found to be associated with certain patterns of work disability[23]. In previous studies, a higher level of depressive symptoms was demonstrated to be related to a longer period of sick leave, which might reflect more severe mental health issues[26, 34–36]. Ervasti *et al.* reported that temporary employment was associated with longer periods of sick leave than permanent employment; therefore, the subjects of the present study might have taken shorter periods of sick leave than would be the case for all Japanese workers because all of the subjects were in permanent employment[37]. There were no gender differences in the duration of sick leave, while Kausto *et al.* reported that females with depression tended to take shorter periods of sick leave than males with depression[38].

Our study indicated that a longer initial period of depression-induced sick leave is a predictor of a longer second period of sick leave. As far as we knew, there was few study investigating the duration of 1st and 2nd sick leave. While depressive symptoms can be alleviated by treatment, cognitive vulnerability-stress theories suggest that some negative psychological patterns may remain, e.g., psychological scars caused by the first period of sick leave might influence the second period of sick leave[39]. Age was previously found to predict the duration of sick leave, although no previous studies have focused on recurrent sick leave[26]. Further research should analyze the associations between the duration of sick leave and work-related factors.

While many studies have reported that older age is a predictor of not returning to work, our findings do not agree with this[40, 41].

We consider that "a longer initial period of sick leave due to depression" is an important predictor for the tertiary prevention of occupational mental health issues. Employers and occupational professionals should take good care of employees that exhibit the factor in order to prevent recurrent sick leave because longer periods of sick leave can be expensive due to loss of labor, medical treatment costs, etc.

Strengths and limitations

Regarding the strengths of this study, firstly, we enrolled a rather large number of subjects (more than 200 Japanese employees who had experienced two episodes of sick leave and returned to work twice. Secondly, our study had greater validity than previous studies, as it was based on psychiatrists' certificates, rather than on self-reported data. However, we had no data on comorbidities, and it was unclear whether the subjects' diagnoses changed over time.

As for the limitations of this study, firstly, no data about clinical psychiatric treatment were available for this study. While we used an ICD-10 diagnosis of a single depressive episode (based on certificates with sufficient diagnostic precision from a psychiatric clinic) to identify appropriate subjects, there could have been some differences in the standards used by each psychiatrist to make RTW decisions[42]. Secondly, while OP registered one diagnosis per sick leave episode, employees with depression can also have other diseases (schizophrenia, alcoholism, dementia, etc.)[43]. As sick leave due to mental disorders is associated with depression, anxiety, sleep disorders, and fatigue, further research is needed to analyze this issue in detail[26, 44]. Thirdly, this study might have included employees who had experienced previous episodes of psychiatric disorders before the follow-up period. Fourthly, it is difficult to generalize our results to other countries or companies. Fifthly, we did not consider the impact of a partial RTW; i.e., when an employee works reduced hours or when their duties are modified. Finally, the representativeness of the study population might have been adversely affected by the fact that there were 31 employees who dropped out after returning to work (17 employees who were lost to follow-up and 14 employees who left the company after their first period of sick leave). However, this is not considered to have had a large impact on the study because such dropouts only accounted for 5.05% of all employees who returned to work (n=614).

In future, more longitudinal studies are required to clarify the optimal strategy for the tertiary prevention of occupational mental health issues.

Conclusion

In this study, the second period of depression-induced sick leave was longer than the first period of such sick leave. A longer initial period of sick leave due to depression was identified as a predictor of a longer second period of depression-induced sick leave.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgements

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