Potential Work Time Lost Due to Sickness Absence and Presence Among Japanese Workers

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Objective: The current study aimed to quantify the overall sickness absence and sickness presence in five Japanese companies. **Methods:** Two indicators were calculated: worktime lost rates and average working days lost per employee per annum. **Results:** In total, 1.1% of working days per annum were lost due to sick leave. The average number of annual sick-leave days per employee was 2.58. Sickness presence accounted for a total worktime loss of 6.55% and an average of 15.36 work days lost per employee per annum. Overall, employees lost 7.65% of their total working days, or an average of 17.92 days were lost per employee per annum, due to sickness leave and sickness presence combined. **Conclusion:** Sickness-absence rate among Japanese workers is quite lower than other countries; however, sickness presence is more critical than absenteeism, which is in line with other countries.

Keywords: absenteeism, presenteeism, worktime lost

Sickness absence (also called absenteeism) refers to absence from work that is attributed to sickness by the employee and accepted as such by the employer.[1] Sickness presence (presenteeism) is defined as worktime during which an ill employee continues to attend work.[2]

Issues of absenteeism, presenteeism, and their consequences for cost and workers' health have become major concerns among working societies and their stakeholders worldwide. Several studies in Japan[3–5] and other countries[6,7] have shown that absenteeism and presenteeism among Japanese workers represent substantial cost burdens and are becoming major concerns in the health economy.

In recent decades, controlling sickness absence has become a priority for many management agendas, and data on absenteeism have increasingly being used as an integrated measure of health in the working population.[8–10] However, the incidence of sickness presence is on the rise.[2]

Sickness presence might not seem to directly influence a company's finances to the same degree as a worker's absence, the related loss of work productivity could indirectly, but highly, affect the company's work output. Sickness presence is not only matter of work productivity but also could be an early sign of long-term sickness absences, thus considered as a hazardous work exposure potentially related to heightened risk of subsequent prolonged sick leaves.[11–13]

Therefore, quantifying both absenteeism and presenteeism could greatly help managers to better understand absence or sickness presence behavior. Moreover, such data could help researchers identify various risk factors, including socioeconomic factors, work-related risk factors (eg, physical work demands and psychosocial work factors), unhealthy behaviors, and chronic health problems among workers. Previous studies have used various tools to quantify absenteeism and presenteeism in specific professions, such as nursing,[14] or due to specific chronic diseases.[15] Here, we sought to quantify the overall sickness absence and sickness presence in five Japanese companies by using a WFun (Work Functioning Impairment) tool[16] to screen data from all workers.

METHODS

The utilized data were obtained in 2016 and represented a total of 15,411 employees from five companies. The data consisted of (1) days of long-term sick leave ($\geq$1 month consecutive sick leave days per year); (2) days of short-term sick leave ($<$1 month consecutive days); and (3) sickness presence, which was the number of days that employees lost working ability due to symptoms, with the single most disturbing symptom recorded. Data were also obtained on the employees' socioeconomic factors, type of work, and working status (full- or part-time). Type of work was categorized solely based on the characteristics of the companies involved in the study. For example, type of work ''research'' is referred to marketing researches and ''development'' is to clinical trials.

The total number of long-term sick leave days over the 1-year period was provided by companies. All causes (diagnoses) of long-term sick leave were recorded based on the medical certificate written by the attending physician. Diagnoses were recorded in accordance with ICD 10 code. The total number of short-term sick leave days during the prior 3 months and the number of days with sickness presence (and the most disturbing symptom) for the prior 1 month were collected directly from employees using a questionnaire.

Two indicators were calculated: worktime lost rates and average working days lost per employee per annum. To calculate the worktime lost rate, the number of workdays lost to sickness absence or presence per year was divided by the total number of available workdays and expressed as a percentage. To calculate the total number of available workdays, the total number of workers was multiplied by the number of rostered workdays per year. Given that short-term sick leave and sick presence data covered periods of 3 months and 1 month, respectively, the numbers of days for these parameters were multiplied by 4 and 12 to get the annual short-term sick absences and presences. The total number of available rostered

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Clinical Significance: 0.11% of total working days were lost per annum due to long-term sick leave, and more than half of these absences were attributed to mental disorders. Stiff neck/shoulders, fatigue, depression/anxiety and dry eye problems accounted for a large proportion of the sickness presence among employees.

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workdays per year was estimated to be 236 days for full-time workers and 173 days for part-time workers; these numbers were calculated by excluding weekends, all available public holidays, and average paid leaves.

To determine sickness presence, we asked the employees to report their health problems relative to 14 categories during prior month. These 14 items were selected as highly prevalent symptoms among Japanese workers across 34 symptoms that were studied previously.[17] It is more unlikely that employees can recall how much they had been affected by every single symptom; thus, we asked them to report to identify only one symptom that disturbed their work performance at most. These data were collected using the WFun questionnaire, which has only seven-item self-assessment questions, each of which is scored from 1 (best health) to 5 (worst health).[16] Thus, the total WFun score ranges from 7 (best health) to 35 (worst health). The total number of days lost due to sickness presence was calculated by multiplying the number of days affected by the single most disturbing symptom and its disability weight. This is exactly the same principle used to calculate years lived with disability (YLD). The disability weight was estimated on the basis of the WFun score by considering whether workers suffering from certain symptoms would retain at least 50% of their work ability at work. For example, we considered that the disability weight would be equal to 0 for those who obtained total WFun score of 7 and 0.5 for those obtained WFun score of 35 and others are in between.

This threshold 50% was chosen because the national guideline recommends that some of those returning to work after sick leave due to a health problem, especially mental health, begin by working half days depending on their condition.[18]

The average sickness absence/presence per employee was calculated by dividing the total number of days with sickness absence and presence by the total number of employees.

Analysis of variance (ANOVA) and *t* test was conducted to check within-group difference.

For confidentiality, the company names are not disclosed; instead, they are identified as Companies A, B, C, D, and E. Two of them were (A and D) were pharmaceutical, two (B and E) were office equipment manufacturing, and one (C) was health insurance company.

The purpose and design of the study were explained to all employees and employers through email, the company's homepage, the company's committee of occupational health and safety, and/or the health insurance union before the inception of research. Employees could freely choose to participate in the study. Employees' answers on the questionnaire were not disclosed to their employers.

The study was approved by the ethics committee of the University of Occupational and Environmental Health, Japan.

RESULTS

Table 1 summarizes the basic characteristics of companies involved in the study. Total of 15,411 out of 23,795 employees from two (A and D) pharmaceutical, two (B and E) office equipment manufacturing, and one (C) health insurance company were involved in the study, with response rate 65%.

Table 2 summarizes the annual worktime lost and the average days lost per employee due to long-term, short-term sick leave, and sickness presence. The companies involved in the study lost an average of 0.11%, 0.99%, and 6.55% of their workers' total working days due to long-term sick leave, short-term sick leave, and sickness presence, respectively. The rate of total worktime lost due to sickness absence (both short- and long-term) was 1.1%, while the rate of total worktime lost due to sickness absence and presence was estimated to be 7.65%. During the 1-year period, the numbers of workdays lost per employee due to long-term sick leave, short-term sick leave, and sickness presence were calculated to be 0.26, 2.32, and 15.36 days, respectively. Each employee lost 2.58 working days per year due to total sick leave and 17.92 days due to sickness absence and presence combined.

Worktime lost rates and average days lost per employee were also broken down by company, gender, age group, and type of work (Table 2). Statistically significant within-group differences are marked with an asterisk (*). The rates of worktime lost to long-term sick leave, short-term sick leave, and sickness presence did not differ significantly by the type of work.

Regarding long-term sick leave, employees of company C lost 0.34% [95% confidence interval (95% CI) = 0.04 to 0.64] of the total working days per year, which was a significantly higher work loss than seen in the other companies ($P = 0.03$). No significant difference was found for sex, age group, or type of work.

Regarding short-term sick leave, employees of company E lost 1.42% (95% CI = 1.29 to 1.54) of the total working days per year, which was a significantly higher work loss than seen in the other companies ($P < 0.0001$). Higher percentages of working time were lost by female workers (1.19%; 95% CI = 1.11 to 1.31) compared with male workers (0.93%; 95% CI = 0.89 to 1.00) ($P < 0.0001$), and by employees older than 60 (1.43%; 95% CI = 1.18 to 1.78) compared with those belonging to the other age groups ($P < 0.0001$).

Regarding sickness presence, employees of company C lost a higher percentage of working time (10.14%; 95% CI = 8.45 to 11.94) than seen in the other companies ($P < 0.0001$). Employees of company A (5.59%; 95% CI = 5.24 to 5.97) and D (5.91%; 95% CI = 5.65 to 6.23) lost the lowest percentages of working time.

Higher percentages of working time were lost by female workers (8.31%; 95% CI = 7.94 to 8.75) than male workers (6.03%; 95% CI = 5.83 to 6.24) ($P < 0.0001$) and by workers aged 30 to 39 years (6.56%; 95% CI = 6.18 to 6.98), 40 to 49 years (7.07%; 95% CI = 6.77 to 7.41), and 50 to 59 years (6.87%; 95% CI = 6.52 to 7.23) compared with those younger than 29 years (5.04%; 95% CI = 4.58 to 5.76) and older than 60 (4.32%; 95% CI = 3.69 to 5.06) ($P = 0.0004$).

Table 3 summarizes that a total of 76 workers took long-term sick leave during the 1-year period, and were absent for 3974 days. More than half (50.12%) of this absenteeism was attributed to major depressive disorder (ICD10 F32) and reaction to severe and adjustment disorders (ICD10 F43). The mean duration of long-term sick leave was 52 days. Workers with psychological problems, including major depressive disorder (60 days), reaction to severe stress (56),

TABLE 1. Basic Characteristics of Companies Involved in the Study

ID	Type of Companies	Number of Employees	Number of Respondents	Response Rate
A	Pharmaceutical	5,882	3,463	59%
B	Office equipment manufacturing	6,000	3,626	60%
C	Health insurance	463	274	59%
D	Pharmaceutical	7,150	5,829	82%
E	Office equipment manufacturing	4,300	2,219	52%
Total		23,795	15,411	65%

TABLE 2. Annual Worktime Lost Rate and Average Days Lost Due to Sickness Absence and Presence

	Long-term Sick Leave		Short-term Sick Leave		Total Sick Leave†		Sickness Presence		Total Sick Leave and Sickness Presence	
	Worktime Lost Rate (95% CI)	Average Sick Absence/ Presence*	Worktime Lost Rate (95% CI)	Average Sick Absence/ Presence*	Worktime Lost Rate	Average Sick Absence/ Presence*	Worktime Lost Rate (95% CI)	Average Sick Absence/ Presence*	Worktime Lost Rate	Average sick Absence/ Presence*
Company										
A	0.16 (0.09–0.24)	0.38	1.00 (0.9–1.14)	2.32	1.16	2.12	*5.59* (5.24–5.97)	13.02	6.75	15.72
B	0.10 (0.04–0.16)	0.23	NA	NA			7.80 (7.41–8.20)		18.42	
C	0.34 (0.04–0.64)‡	0.78	1.05 (0.8–1.32)	2.46	1.39	2.63	**10.14** (8.45–11.94)‡	23.67	11.53	26.92
D	0.10 (0.05–0.14)	0.23	0.83 (0.78–0.90)	1.94	0.92	1.68	*5.91* (5.65–6.23)	13.80	6.82	15.94
E	0.05 (-0.01 to 0.1)	0.11	1.42 (1.29–1.54)‡	3.34	1.46	2.62	7.13 (6.63–7.62)	16.83	8.58	20.26
Sex										
Male	0.09 (0.06–0.13)	0.22	0.93 (0.89–1.00)‡	2.19	1.03	1.86	6.03 (5.83–6.24)‡	14.18	7.06	16.58
Female	0.16 (0.08–0.23)	0.37	1.19 (1.11–1.31)	2.75	1.35	2.43	8.31 (7.94–8.75)	19.32	9.65	22.42
Age class, years										
<29	0.07 (0.02–0.13)	0.17	*0.75* (0.65–0.88)	1.75	0.82	1.49	*5.04* (4.58–5.76)	11.82	5.87	13.75
30–39	0.15 (0.07–0.22)	0.34	*1.00* (0.92–1.10)	2.34	1.14	2.10	6.56 *(6.18–6.98)*	15.40	7.71	18.08
40–49	0.14 (0.08–0.2)	0.33	*0.95* (0.88–1.04)	2.23	1.09	2.00	7.07 *(6.77–7.41)*	16.60	8.16	19.16
50–59	0.07 (0.04–0.11)	0.17	1.08 (0.96–1.21)	2.55	1.16	2.08	6.87 *(6.52–7.23)*	16.17	8.02	18.86
>60	0.00	NA	1.43 (1.18–1.78)‡		3.16		*4.32 (3.69–5.06)*‡		9.72	
Types of work										
Office work	0.19 (0.09–0.23)	0.43	1.17 (1.05–1.30)	2.73	1.35	3.16	7.10 (6.65–7.65)	16.57	8.45	19.73
Sales	0.05 (0.02–0.09)	0.13	0.63 (0.54–0.74)	1.49	0.69	1.62	*5.15* (4.80–5.52)	12.12	5.84	13.73
Research	0.19 (0.04–0.34)	0.44	0.76 (0.66–0.86)	1.80	0.95	2.24	6.06 (5.47–6.63)	14.27	7.01	16.51
Development	0.06 (-0.02 to 0.14)	0.13	1.06 (0.83–1.30)	2.49	1.12	2.63	5.83 (4.90–6.79)	13.73	6.95	16.36
Technician	0.00		0.97 (0.61–1.36)		2.26		5.76 (4.72–6.85)		13.41	
Line workers	0.18 (0.06–0.31)	0.41	1.16 (1.04–1.37)	2.62	1.34	3.03	5.88 (5.23–6.65)	13.31	7.19	16.29
Engineer	0.27 (-0.16 to 0.70)	0.63	0.86 (0.56–1.16)	1.99	1.13	2.62	*4.24* (3.14–5.38)	9.87	5.36	12.49
Others	0.08 (-0.04 to 0.21)	0.19	1.00 (0.76–1.38)	2.29	1.09	2.48	*7.28* (5.78–8.82)	16.68	8.35	19.13
Total	0.11 (0.08–0.14)	0.26	0.99 (0.95–1.06)	2.32	1.10	2.58	6.55 (6.37–6.75)	15.36	7.65	17.92

Bold and italic refer to identical value.
*Per employee per year.
†Short-term and long-term sick leave combined.
‡Statistically significant difference ($P < 0.05$).

TABLE 3. Long-term Sick Leaves by Disease Classification (Per Year)

#	ICD10 Code	Diseases	Long-term Sick Leaves (%)	No. of Workers with Sick Leave	Average Duration, days	Worktime Lost Rate (%)
1	F32	Major depressive disorder, single episode	1370.7 (34.50%)	23	60	0.038
2	F43	Reaction to severe stress, and adjustment disorders	620.7 (15.62%)	11	56	0.017
3	F31	Bipolar disorder	261.4 (6.58%)	3	87	0.006
4	G90	Disorders of autonomic nervous system	202.9 (5.11%)	3	68	0.003
5	F41	Other anxiety disorders	122.9 (3.09%)	2	61	0.007
6	C18	Malignant neoplasm of colon	106.4 (2.68%)	3	35	0.002
7	J18	Pneumonia, unspecified organism	106.4 (2.68%)	1	106	0.006
8	F22	Delusional disorders	97.1 (2.44%)	1	97	0.003
9	F20	Schizophrenia	95.0 (2.39%)	1	95	0.001
10	N18	Chronic kidney disease (CKD)	87.9 (2.21%)	1	88	0.002
11	F34	Persistent mood [affective] disorders	82.9 (2.09%)	3	28	0.003
12	T85	Complications of other internal prosthetic devices, implants, and grafts	60.7 (1.53%)	1	61	0.003
13	C48	Malignant neoplasm of retroperitoneum and peritoneum	55.7 (1.40%)	1	56	0.001
14	H83	Other diseases of inner ear	44.3 (1.11%)	1	44	0.001
15	F40	Phobic anxiety disorders	41.8 (1.05%)	1	42	0.001
16	I61	Nontraumatic intracerebral hemorrhage	39.3 (0.99%)	1	39	0.001
17	S82	Fracture of lower leg, including ankle	35.4 (0.89%)	1	35	0.000
18	M16	Osteoarthritis of hip	35.0 (0.88%)	1	35	0.001
19	K50	Crohn disease [regional enteritis]	30.7 (0.77%)	1	31	0.003
20	M32	Systemic lupus erythematosus (SLE)	74.0 (1.86%)	1	74	0.001
21	L03	Cellulitis and acute lymphangitis	25.0 (0.63%)	1	25	0.001
22	O21	Excessive vomiting in pregnancy	24.3 (0.61%)	2	12	0.001
23	I42	Cardiomyopathy	22.9 (0.58%)	1	23	0.001
24	I48	Atrial fibrillation and flutter	22.9 (0.58%)	1	23	0.001
25	O20	Hemorrhage in early pregnancy	22.1 (0.56%)	1	22	0.001
26	M34	Systemic sclerosis [scleroderma]	21.4 (0.54%)	1	21	0.000
27	K85	Acute pancreatitis	20.7 (0.52%)	1	21	0.002
28	Q61	Hemorrhage in early pregnancy	16.6 (0.42%)	1	17	0.001
29	I49	Other cardiac arrhythmias	15.0 (0.38%)	1	15	0.000
30	M51	Thoracic, thoracolumbar, and lumbosacral intervertebral disc disorders	12.9 (0.32%)	1	13	0.001
31	Unknown		198.8 (5.00%)	4	50	0.002
	Total		3,974 (100.00%)	76	52	0.11

bipolar disorder (87), other anxiety disorders (61), delusional disorder (97), and schizophrenia (95), were likely to have longer absences. Other chronic conditions, including neoplasms, pneumonia, and some pregnancy problems, were also associated with relatively high numbers of consecutive sickness absence days. Of the total working rostered days, 0.11% were lost to long-term sick leave, with major depressive disorders (single episode) and reaction to severe stress and adjustment disorders causing losses of 0.038% and 0.017%, respectively, of the total working rostered days.

Table 4 summarizes the worktime lost due to sickness presence per month. A total of 7676 workers reported that they lost 18,357 days; these work losses were largely due to symptoms such as painful neck or stiff neck and shoulders (19.86%), depression or anxiety (12.03%), dry eye (12.82%), and fatigue (12.36%). The average number of days lost per month for each symptom varied from 1.20 (tooth trouble) to 3.76 (anxiety, depression) with a mean of 2.39 days.

DISCUSSION

In the present work, we sought to quantify the absenteeism and presenteeism among workers in five Japanese companies. Many strategies can be used to measure sickness absence, each of which provides a different information set. This has led to a confused terminology, with different terms being used for similar measures. Here, we assessed the worktime loss rate (also called the absence rate), which was calculated as the number of workdays lost due to sickness absence per year divided by the total number of available workdays, expressed as a percentage.

Across the five studied companies, 0.11% of total working days were lost per annum due to long-term sick leave, and more than half of these absences were attributed to mental disorders. This is consistent with our recent report showing that workers under psychological treatment tend to use more sick leave days.[19] The present study did not find any sex-related difference in overall long-term sick leave. This is consistent with the findings of similar studies among Japanese workers,[20] whereas studies in other countries have found that the long-term sick leave rate especially, due to mental disorders, is greater among women than men.[21–23] This may reflect that, compared with Japanese men, Japanese women diagnosed with a mental disorder or another disease who may require extended leave are more likely to quit their job rather than taking long-term sick leave. Numerous other studies of Japanese[20] and European[24] workers have found that mental illness is the top cause of long-term absence. Thus, the present and previous findings prove that both employers and employees should seek to holistically address mental health problems.

We also did not find any significant age group-related difference in long-term sick leave. Some previous surveys found out that older age is a significant predictor for longer duration of sick leave[25,26]; however, greater number of studies did not reveal any age differences in terms of health related absences due to overall illnesses.[20,27–30] Survey among employees in the UK found that workers aged 20 to 59 years were at the highest risk of having long-

TABLE 4. Worktime Lost Due to Sickness Presence by Symptom

No.	Symptom	Days Lost (%) per Month	No. of Workers Presented Symptom (per Month)	Average no. of Days Lost (per Month)	Worktime Lost Rate (% per Year)
1	Painful neck or stiff shoulders	3,645 (19.86%)	1,411	2.58	1.30
2	Dry eye, glaucoma, etc	2,353 (12.82%)	1,031	2.28	0.84
3	A sense of weariness or fatigue	2,267 (12.35%)	846	2.68	0.81
4	Depression, anxiety	2,208 (12.03%)	587	3.76	0.79
5	Insomnia	1,729 (9.42%)	664	2.60	0.62
6	Back pain	1,364 (7.43%)	794	1.72	0.49
7	Others	1,035 (5.64%)	535	1.93	0.37
8	Headaches	853 (4.65%)	645	1.32	0.30
9	Recurrent diarrhea, constipation	798 (4.35%)	497	1.61	0.28
10	Skin disease/Itchiness	733 (3.99%)	319	2.30	0.26
11	Allergy	447 (2.44%)	347	1.28	0.16
12	Pain in arm and leg joints, lack of mobility	568 (3.09%)	294	1.93	0.20
13	Cold, influenza, gastroenteritis	253 (1.38%)	210	1.20	0.09
14	Tooth trouble	104 (0.57%)	87	1.20	0.04
	Total	18,357 (100.00%)	7,676	2.39	6.55

term sick leave.[31] Another study[32] showed that workers in the 30 to 59 age category have a higher risk of long-term sickness absence than those aged 18 to 29 years and those aged 60 years or older. We divided workers into five groups with 10-year intervals spanning from less than 29 to over 60. It is likely that the use of age range and types of disease studied hamper the comparability of research results on long-term sick leave. Thus, it supports the idea of previous research that age should be treated as a variable of interest instead of a control variable.[27]

Our results revealed that short-term sick leave accounted for a loss of 0.99% of total working hours per year. Data for short-term sick leave were not available for Company B, so these numbers are likely to be a slight underestimation. Compared with men, women tended to lose more worktime due to short term-sick leave. Workers older than 60 years were more likely to take short-term sick leave, while workers younger than 29 years tended to take less. This might reflect that the health status of older employees is weaker than that of younger ones, meaning that elders are likely to account for a higher percentage of lost worktime. In this respect, our results are consistent with some previous findings[31] but not with some others. For example, older age groups in Nordic countries have a stricter view than younger age groups in terms of sickness absence.[33] This attitude and culture leads to possible higher short-term sickness absence among younger age groups.[34] Thus, it supports the idea that age should be treated as a variable of interest instead of a control variable[27] as we aforementioned.

The total sickness absence rates (both long-term and short-term sick leave) were 1.1% and average sick absence per employee was 2.58 days. As aforementioned, due to unavailability of data for short-term sick leave for Company B, these numbers are likely to be a slight underestimation. However, the rate of 1.1 is much lower than those found in other studies of sick leave. For example, the UK's largest annual survey of sickness absence rates showed that sickness absence accounted for an average loss of 2.8% of working time per annum, or 6.5 days per employee, during 2014,[35] while the absence rate among companies with more than 500 workers in some European countries was reported to be around 3.58%.[36] The average sickness absence days per employee per year during 2007 to 2012 in Denmark was 8.89 days,[34] which is 3.5 times higher than our result.

These apparent discrepancies may reflect the hard-working culture, and/or sick leave system of Japan. Short-term leave is not regulated by labor laws in Japan, but rather is negotiated between the company and the employee.[35,37]

Thus, if an ill employee must use paid vacation time for a short-term absence, they might be unlikely to stay home with a minor ailment that is compatible with work. This might create the problem of presenteeism, wherein employees turn up at the workplace despite being sick, as many other researches have also proved that policies intended to reduce sickness absence may ultimately increase presenteeism.[38,39] Chatterji et al[40] also suggested that ''any attempt at reducing the potential productivity loss from absence to be offset against the potential productivity loss from presenteeism.'' Then, sickness presence in turn leads to further long-term sickness absences[11–13]; thus, employers need to establish comprehensive management system to control the sickness absence along with sickness presence.

Here, we found that 6.55% of total worktime was lost due to sickness presence. This is 60 times higher than the long-term sick leave rate and six times greater than the short-term sick leave rate.

The average days lost per employee per year due to sickness presence was 15.36, which was six times higher than the total sick leave absence. This supports the idea that presenteeism could be a more critical issue than absenteeism in Japan. Our result is in line with other studies including the one by Dixon,[41] in a US survey, which reported that employee burnout and lost productivity were 7.5 times greater with presenteeism than absenteeism. Although many other researchers have already proved that the loss of productivity is greater with presenteeism than absenteeism,[41–44] the presenteeism was introduced in Japan relatively recently; thus, novel ways of assessing and controlling presenteeism may constitute new health management paradigms in Japan.[45]

In the present study, we calculated the worktime lost due to only the single most disturbing symptom that an employee experienced in the prior month; this excluded other problems that might also have affect the employee's working ability to some degree, and thus, our worktime lost rate of 6.55% should be an underestimation. Compared with male workers, female workers tended to lose more worktime to sickness presence. We do not have any explicit explanation for this, but speculate that it may reflect pregnancy- or menstruation-related problems or indicate that female workers are more likely to be sensitive to symptoms faced while working. Companies A and D (pharmaceutical) were similar in their working conditions and management styles, and had identical rates of sickness presence. Companies B and E (office equipment manufacturing) also had similar characteristics and identical sickness presence rates. Thus, we hypothesized that certain workplace

factors can affect employee's health; however, we could not find work type-related difference in statistical analysis. We feel that some organizational factors including short-term sick leave management, requirement of high work attendance, and working time arrangement might have influenced on sickness presence to greater extent than work types. Previous researches also highlighted the important role of managers for controlling presenteeism through their management style.[46–48]

In terms of between-group differences with respect to demographics, employees aged 40 to 49 years tended to have higher sickness presence rates, whereas those older than 60 years and younger than 29 years had the lowest sickness presence rates. This may reflect that older workers take short-term sick leave when they feel sick, which is consistent with our finding that the highest short-term sick leave rate was observed among employees older than 60 years. We further speculate that employees younger than 29 years might be more sensitive to any symptom, as they have less experience with working under adverse conditions.

We found that stiff neck/shoulders, fatigue, depression/anxiety, and dry eye problems accounted for a large proportion of the sickness presence among employees. Our findings are consistent with a previous study involving employees of the United States health care system, which found that the highest estimated daily productivity loss and annual cost per person were associated with chronic back pain, mental illness, general anxiety, migraines or severe headaches, neck pain, and depression.[7] Again, although we assessed whether work type influenced the presence rates, we did not find any statistically significant difference. In the future, it would be useful to examine whether specific problems, particularly those listed above, are affected by the any working conditions and work type.

The present study has several strengths and weaknesses that warrant mention. Regarding strengths, we first note that the sample size of 15,400 employees is relatively large for a sick leave study. Second, this study used long-term sick leave data from official company records, which were free from recall bias and based on a highly reliable physician's diagnosis. Third, the WFun tool[16] was used, and the WFun score was converted to a disability weight to estimate the potential working days lost due to sickness presence. The WFun tool has proved useful in detecting health problems that affect working ability,[49] and the length and handiness of the questionnaire outweighs the any possible limitation.

Regarding weaknesses, we first note that, because of data availability, the average absence rate calculated in the current study might relate to a few absences of longer duration, several shorter absences, or a combination thereof; thus, an apparently stable absence rate might not reflect a change in the underlying absence behavior. This measure does, however, enable an organization to conceptualize exactly how much personal leave is being taken by their employees and benchmark these findings. In a future effort to identify the underlying absence trends and patterns, it would be useful to apply more exact measures, such as individual spells of absence and the average duration of each absence spell. Second, we questioned employees retrospectively on how many days of short-term sick leave they had taken during the prior 3 months; thus, recall bias could have led to over- or underestimation. The data on sickness presence were also retrospectively collected by questionnaire, and would similarly carry the risk of recall bias. Third, we did not collect data on the reason for short-term sick leave because we believed that employees were likely to have trouble precisely recalling the reason for each spell. This hampered our ability to perform any detailed investigation of the short-term sick leave pattern. Fourth, we approximated the annual short-term sickness absence and sickness presence by multiplying these values by 4 and 12, respectively (see Methods section). This could introduce a lack of accuracy.

On the basis of the present findings, we propose that presenteeism is a more critical issue in Japan than previously understood. Efforts to establish a system for measuring presenteeism could help managers take proper actions against the underlying causes. However, although there have been hundreds of attempts to quantify presenteeism, no such strategy has yet been put in regular practice. On the basis of our current findings, we plan to examine the use of the WFun tool for the penetrating quantification of presenteeism in companies. For example, employees could be asked to complete the WFun questionnaire at the end of every month, indicating any symptom that affected their working ability and its duration. The obtained data could be compiled by human resource staff or an occupational physician on a monthly or quarterly basis and further used for routine efforts to control sickness presence.

CONCLUSION

In total, 1.1% of working days per annum were lost due to sick leave, with 0.11% and 0.99% corresponding to long-term and short-term sick leave, respectively. More than half of the long-term sick leave was attributed to mental disorders. The average number of annual sick-leave days per employee was 2.58, and the average numbers of short- and long-term sick leave days per employee were 0.26 and 2.32, respectively. Sickness presence accounted for a total worktime loss of 6.55% and an average of 15.36 work days lost per employee per annum. Overall, employees lost 7.65% of their total working days per year, or an average of 17.92 days were lost per employee per annum, due to sickness leave and sickness presence combined. Sick leave rate among Japanese workers is quite lower than other countries; however, sickness presence issue is more critical than absenteeism, which is in line with other countries.

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