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EFFECTS OF WORK BURDEN, JOB STRAIN AND SUPPORT ON DEPRESSIVE SYMPTOMS AND BURNOUT AMONG JAPANESE PHYSICIANS

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Abstract
Objectives: Days off, on call, night duty, working hours and job stress can affect physicians' mental health, and support from supervisors and co-workers may have a buffering effect. This study elucidates whether job strain and job factors affect physicians' mental health, and whether support from supervisors and co-workers has a protective effect on their mental health. **Material and Methods:** The subjects included 494 physicians. The Brief Job Stress Questionnaire (BJSQ) was used to evaluate job demand, job control and support. High job strain was defined as a combination of high job demand and low job control. Depressive symptoms were assessed using the Patient Health Questionnaire-9. The Maslach Burnout Inventory-General Survey was used to evaluate burnout. Possible confounder adjusted logistic regression analyses were performed to obtain odds ratios for depressive symptoms and burnout. **Results:** As per the analysis, high job strain had significantly higher odds ratios, and support from co-workers had significant protective odds ratios for depressive symptoms. High job strain and having only 2–4 days off per month (compared to > 8 days off per month) had significantly higher odds ratios, and support from co-workers had significant protective odds ratios for burnout. **Conclusions:** High job strain was related to depressive symptoms and burnout, and support from co-workers had a buffering effect on depressive symptoms and burnout. An inadequate number of days off was related to burnout. Assessment of job strain may be a good tool to measure physicians' mental health, and a sufficient number of days off may be needed to prevent burnout.

Key words:
Social support, Depressive symptoms, Burnout, Job satisfaction, Job strain, Physician

INTRODUCTION

Physicians now confront increasing burdens, such as a rapidly expanding knowledge base and increasing clinical demand, which affect their well-being [1]. Japanese hospital physicians tend to have long working hours [2,3], and the shortage of some specialties, such as pediatrics, obstetrics-gynecology and surgery, is one of the Japanese health care system problems [4].

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Long working hours affect mental health among other work populations [4,5]; and the relationship with physicians' mental health has been reported [6]. Moreover, days off, on call and night duty have been reported to affect physicians' mental health [7,8].

The demand–control–support (DCS) model [9] is a major job stress model that has been widely used in the field of occupational health. The model has 2 dimensions, job demand and job control, with social support being included as a 3rd dimension. Job control among German junior doctors, as estimated by the DCS model, is related to mental health [10]. Job strain means that although demands are high, workers have few opportunities to use their skills and make decisions; it has also been related to depression among Canadian general workers [11]. Among Canadian physicians, job demands have been related to emotional exhaustion and physical symptoms, and resources, including job control, have been related to personal accomplishments and decreased depersonalization [12]. Among German physicians, job strain has been significantly related to their quality of care [13]. However, in Japan, the relationship between job strain and physicians' mental health has not been fully investigated.

It has also been reported that social support at work has a buffering effect on depressive symptoms among London civil servants [14], and that social support from family/friends has a buffering effect on depressive symptoms among Japanese physicians [6]. However, the buffering effect of support from supervisors and co-workers on physicians' mental health has not been fully investigated, either.

Burnout is characterized by emotional exhaustion, depersonalization and negative self-evaluation among various professionals involved in people-oriented services, including health care staff such as physicians [15,16]. Physicians' burnout status has been reported to be associated with the intention to change jobs [17], job dissatisfaction [18] and low-quality patient care [19,20]. A review described burnout as more job-related and situation-specific than general depression, though depression-prone people are more vulnerable to burnout [16]. Burnout symptoms estimated using the MBI (Maslach Burnout Inventory) are discriminative because exhaustion and depersonalization/reduced professional efficacy are required in the work context [21]. Therefore, burnout is a notable mental health indicator among physicians.

In this study, to elucidate whether job strain affects physicians' mental health and whether support from supervisors and co-workers has a protective effect, these variables were simultaneously introduced in logistic regression models in which outcomes were depressive symptoms and burnout. In addition to this, to elucidate specific work burdens – days off, on call, night duty, and long working hours – which affect physicians' mental health, these variables and support from supervisors and co-workers (but not job strain because it contains work burden) were simultaneously introduced in the logistic regression models.

MATERIAL AND METHODS

Participants

We dispatched self-administered questionnaires to the entire alumni population of Asahikawa Medical University (N = 2937) via post in December 2009. These questionnaires had previously been used to study regional differences in job stress and burnout status among hospital physicians [22]. Twenty questionnaires were returned as 'addressee unknown' (valid participants – 2917). Participants could choose to respond to the questionnaires by either filling them out on paper or responding on a website. A post card was sent once as a reminder. Among the valid participants (N = 2917), 567 (19.4%) responded to the questionnaires (on paper – 340; on the website – 227). Among the respondents, 517 were hospital or clinic physicians, of which 494 questionnaires were analyzed after excluding 23 because of missing values.

This study was approved by the Institutional Ethical Board for Epidemiological Studies of Asahikawa Medical University (No. 647: November 30, 2009).

Demographics and work-related factors

The questionnaire included information on gender, age (ranges: 24–29, 30–39, 40–49, ≥ 50 years old), marital status, clinical experience (ranges: 0–9, 10–19, ≥ 20 years), clinical specialty (internal medicine, surgery, pediatrics/obstetrics/gynecology, ophthalmology/dermatology, other/unknown), hospital location (large cities: ordinance-designated cities, prefectural capitals, cities with a medical school or university, medium or small cities, other cities, towns, and villages), days off (0–1, 2–4, 5–7, ≥ 8/month), night duty (none, 1, 2–3, 4–5, ≥ 6/month), on call (none, 1–4, 5–7, ≥ 8/month), working hours (none, 1–39, 40–49, 50–59, 60–79, ≥ 80 h/week). The recall period of the final 4 variables was the preceding 1 month.

Job stress and social support

The Brief Job Stress Questionnaire (BJSQ) [23], which is based on the DCS model [9], was used to evaluate 2 job stress dimensions (job demand and job control) and social support from supervisors and co-workers. The BJSQ also includes support from family/friends, but this was not used because we focused on job factors and needed to restrict independent variables owing to the small sample sizes. The BJSQ has been widely used in Japan for practical occupational health evaluation and occupational health research [24–26]. Job demand included 3 items:

1. You have to do an enormous amount of work.
2. You cannot complete all your work in the allotted time.
3. You have to work very hard.

In addition, there were 3 items about job control:

1. You can work at your own pace.
2. You can decide the order in which you do your work and the way you do it.
3. You can provide your opinions on the work strategy for your workplace.

The responses were scored on a 4-point Likert-type scale (1 – agree; 2 – somewhat agree; 3 – somewhat disagree, and 4 – disagree) [25]. To evaluate job demand and job control, the total score for each dimension was used. Higher scores denote higher job demand or control.

Social support from supervisors, co-workers and family/friends was also evaluated using 3 items:

1. You can often communicate with supervisors/co-workers.
2. You can strongly rely on supervisors/co-workers when you have problems.
3. Your supervisors/co-workers are prepared to spend their time on dealing with your personal problems.

The responses to these items were scored on a 4-point Likert-type scale (1 – agree; 2 – somewhat agree; 3 – somewhat disagree, and 4 – disagree).

Job demand and job control scores were each dichotomized at a median value, and job strain was categorized as follows:

– high job strain was defined as present when job demand was high and job control was low,
– intermediate job strain was defined as present when job demand was high and job control was high, or *vice versa*,
– low job strain was defined as present when job demand was low and job control was high.

To evaluate social support from supervisors and co-workers, the total score was calculated for each of the 3 questions; higher scores denote higher social support [26]. Cronbach's α coefficients for the BJSQ subscales – job demand, job control, social support from supervisors and that from co-workers – were 0.82, 0.73, 0.92 and 0.85, respectively.

Depressive symptoms

Depressive symptoms were assessed with the Japanese version of Patient Health Questionnaire-9 (PHQ-9) [27],

the depression subscale of the self-report Patient Health Questionnaire [28]. PHQ-9 consists of 9 items and the total score varies between 0 and 27 [29]. Standard PHQ-9 cut-off scores were used to classify minimal (0–4), mild (5–9) and moderate to severe (≥ 10) symptoms of depression [30]. In this study, positive for depressive symptoms was defined as PHQ-9 scores > 5 to identify mild mental health problems, because it is not common that active working medical doctors have a severe mental health problem. Cronbach's α coefficient for PHQ-9 was 0.88.

Burnout

The Japanese version of the Maslach Burnout Inventory – General Survey (MBI-GS) was used to evaluate burnout [15,31–33]. MBI-GS has 16 items with 3 subscales: exhaustion (5 items), depersonalization (5 items) and professional efficacy (6 items). Each item was scored using a 7-point Likert-type scale ranging from 'never' (0 points) to 'every day' (6 points), based on the frequency of occurrence. The total scores for each subscale were divided by the number of items on the subscale; higher exhaustion and depersonalization scores and a lower professional efficacy score denote higher degrees of burnout. Cronbach's α coefficients for exhaustion, depersonalization and professional efficacy were 0.92, 0.87 and 0.87, respectively.

Each subscale was tertilized because the cut-offs of Japanese general population have not been estimated. The cut-offs of exhaustion, depersonalization and professional efficacy were 4.2, 2.4, and 2.5, respectively, and the upper tertiles of exhaustion and depersonalization and the lower tertile of professional efficacy were defined as subscale positives. Then, on the basis of the common burnout process indicating that exhaustion comes first, followed by depersonalization and diminished professional efficacy, the participants having at least exhaustion positive and having either depersonalization positive or professional efficacy positive were defined as burnout positive [34,35].

Statistical analysis

Crude odds ratios of demographics, work-related factors, job strain and social support from supervisors and co-workers for depressive symptoms and burnout were analyzed by a univariate logistic regression analysis. Then, we conducted multivariate logistic regression analyses with depressive symptoms and burnout as dependent variables adjusted for sex, marital status, clinical experience, place of work, location and specialty. Because 'clinical experience' had stronger relationships than 'age' in the univariate analyses, 'clinical experience' was introduced in the models as an adjusted variable. Since the workload variables such as 'days off,' 'night duty,' 'on call' and 'working hours per week' may be intermediate variables of 'job demand,' we analyzed the following 2 models:

– model 1 – 'days off,' 'night duty,' 'on call,' 'working hours per week,' 'support from supervisors' and 'support from co-workers;'
– model 2 – 'job strain,' 'support from supervisors' and 'support from co-workers.'

To confirm interaction effect between job strain and support, interaction terms between job strain and support from supervisors, and job strain and support from co-workers were also analyzed.

P values < 0.05 were considered statistically significant. All calculations were conducted using IBM SPSS Statistics 21.0 for Windows (SPSS Inc., Chicago, IL, USA).

RESULTS

Table 1 shows the demographic and work-related factors, each score on the BJSQ item, each score on the MBI-GS item, PHQ-9 score, job strain category, depressive symptom positive (PHQ-9 > 5) and burnout positive.

Table 2 shows the crude odds ratio of each variable for depressive symptoms and burnout. Age, clinical experience, days off, night duty, working hours, job strain and support from co-workers were significantly related

Table 1. Participants' characteristics

Variable	Respondents (N = 488)
Men [n (%)]	391 (80.1)
Age (years) [n (%)]	
≤ 29	32 (6.6)
30–39	101 (20.7)
40–49	196 (40.2)
≥ 50	159 (32.6)
Married [n (%)]	373 (76.4)
Clinical experience (years) [n (%)]	
≤ 9	76 (15.6)
10–19	164 (33.6)
≥ 20	248 (50.8)
Place of work [n (%)]	
hospital	409 (83.8)
clinic	79 (16.2)
Location [n (%)]	
large city	304 (62.3)
medium or small city	135 (27.7)
town or village	49 (10.0)
Specialty [n (%)]	
internal medicine	186 (38.1)
surgery	136 (27.9)
pediatrics/obstetrics/gynecology	51 (10.5)
ophthalmology/dermatology	43 (8.8)
other/unknown	72 (14.8)
Days off per month [n (%)]	
none or 1	75 (15.4)
2–4	235 (48.2)
5–7	123 (25.2)
≥ 8	55 (11.3)
Night duty shifts per month [n (%)]	
none	182 (37.3)
1	61 (12.5)
Night duty shifts per month [n (%)] – cont.	
2–3	116 (23.8)
4–5	79 (16.2)
≥ 6	50 (10.2)
On call shifts per month	
none	222 (45.5)
1–4	94 (19.3)
5–7	75 (15.4)
≥ 8	97 (19.9)
Working hours per week [n (%)]	
0–39	31 (6.4)
40–49	89 (18.2)
50–59	97 (19.9)
60–79	173 (35.5)
≥ 80	98 (20.1)
Job stress (M±SD)	
demand	9.1±2.3
control	8.3±2.1
support from supervisors	6.6±2.8
support from co-workers	7.8±2.3
Job strain	
low [n (%)]	76 (15.6
medium [n (%)]	244 (50.0)
high [n (%)]	168 (34.4)
PHQ-9 (M±SD)	4.8±4.7
PHQ-9 ≥ 5 [n (%)]	198 (40.6)
Burnout	
exhaustion (M±SD)	3.1±1.6
depersonalization (M±SD)	1.9±1.5
reduced professional efficacy (M±SD)	3.2±1.4
burnout positive [n (%)]	108 (22.1)

M – mean; SD – standard deviation; PHQ – Patient Health Questionnaire.

to depressive symptoms, and age, clinical experience, days off, night duty, on call, working hours, job strain and support from co-workers were significantly related to burnout.

Table 3 shows the multivariate adjusted odds ratio for depressive symptoms. High job strain had significantly higher odds ratios in model 2, and support from supervisors and co-workers had significant protective odds ratios in all models. We also introduced interaction terms in model 2, and the interaction terms between job strain and support from supervisors, and job strain and support from co-workers had no statistically significant results.

Table 2. Crude odds ratio for depressive symptoms (PHQ-9 > 5) and burnout

Variable	Depressive symptoms			Burnout		
	OR	95% CI	p	OR	95% CI	p
Men (vs. women)	0.71	0.45–1.10	0.126	0.96	0.57–1.64	0.884
Age (years)						
≤ 29	1.00			1.00		
30–39	0.55	0.25–1.24	0.149	1.58	0.62–4.04	0.338
40–49	0.56	0.26–1.19	0.131	1.03	0.42–2.55	0.942
≥ 50	0.42	0.20–0.91	0.029	0.70	0.27–1.78	0.453
Married (vs. unmarried)	0.68	0.45–1.03	0.071	0.59	0.37–0.95	0.029
Clinical experience (years)						
≤ 9	1.00			1.00		
10–19	0.63	0.36–1.09	0.096	0.68	0.38–1.23	0.204
≥ 20	0.46	0.27–0.77	0.003	0.35	0.20–0.64	0.001
Hospital (vs. clinic)	2.02	1.19–3.42	0.009	3.37	1.50–7.57	0.003
Location						
large city	1.00			1.00		
medium or small city	0.90	0.60–1.37	0.621	0.68	0.41–1.14	0.148
town or village	0.81	0.43–1.51	0.506	0.92	0.45–1.88	0.811
Specialty						
internal medicine	1.00			1.00		
surgery	0.77	0.49–1.23	0.275	0.61	0.34–1.08	0.090
pediatrics/obstetrics/gynecology	1.35	0.72–2.51	0.351	0.81	0.38–1.75	0.594
ophthalmology/dermatology	1.20	0.61–2.34	0.597	1.14	0.53–2.46	0.732
other/unknown	1.43	0.83–2.48	0.199	1.56	0.86–2.85	0.147
Days off per month						
none or 1	2.90	1.37–6.10	0.005	4.15	1.46–11.80	0.008
2–4	1.87	0.98–3.58	0.057	3.43	1.31–9.00	0.012
5–7	1.65	0.82–3.31	0.159	2.06	0.73–5.78	0.170
≥ 8	1.00			1.00		

Table 2. Crude odds ratio for depressive symptoms (PHQ-9 > 5) and burnout – cont.

Variable	Depressive symptoms			Burnout		
	OR	95% CI	p	OR	95% CI	p
Night duty shifts per month						
none	1.00			1.00		
1	1.66	0.92–3.00	0.096	1.12	0.52–2.39	0.780
2–3	1.64	1.01–2.64	0.045	1.69	0.95–3.00	0.074
4–5	2.03	1.19–3.49	0.010	2.08	1.12–3.88	0.021
≥ 6	1.64	0.87–3.10	0.130	2.17	1.06–4.46	0.035
On call shifts per month						
none	1.00			1.00		
1–4	1.00	0.61–1.64	0.999	1.23	0.67–2.24	0.500
5–7	1.28	0.75–2.15	0.383	0.66	0.89–3.06	0.109
≥ 8	1.34	0.83–2.17	0.237	1.85	1.06–3.22	0.031
Working hours per week						
0–39	1.10	0.45–2.63	0.842	0.95	0.28–3.12	0.935
40–49	1.00			1.00		
50–59	1.08	0.58–2.01	0.812	0.91	0.38–2.14	0.821
60–79	2.22	1.29–3.81	0.004	2.46	1.23–4.93	0.011
≥ 80	1.95	1.07–3.26	0.030	3.11	1.49–6.52	0.003
Job strain						
low	1.00			1.00		
medium	2.47	1.34–4.55	0.004	3.53	1.22–10.21	0.020
high	3.84	2.05–7.20	< 0.001	11.08	3.86–31.78	< 0.001
Support from supervisors	0.96	0.90–1.03	0.258	0.98	0.91–1.06	0.567
Support from co-workers	0.88	0.82–0.96	0.003	0.86	0.78–0.95	0.002

PHQ – Patient Health Questionnaire; OR – odds ratio; CI – confidence interval.

Table 3. Adjusted odds ratio for depressive symptoms (PHQ-9 > 5)

Variable	Model 1			Model 2		
	OR	95% CI	p	OR	95% CI	p
Days off per month						
none or 1	2.19	0.79–6.04	0.131			
2–4	1.75	0.75–4.10	0.196			
5–7	1.62	0.70–3.79	0.263			
≥ 8	1.00					

Table 3. Adjusted odds ratio for depressive symptoms (PHQ-9 > 5) – cont.

Variable	Model 1			Model 2		
	OR	95% CI	p	OR	95% CI	p
Night duty shifts per month						
none	1.00					
1	1.27	0.61–2.65	0.520			
2–3	1.09	0.58–2.06	0.779			
4–5	1.60	0.82–3.14	0.168			
≥ 6	1.19	0.53–2.68	0.667			
On call shifts per month						
none	1.00					
1–4	0.94	0.54–1.64	0.838			
5–7	0.94	0.50–1.75	0.840			
≥ 8	0.97	0.54–1.75	0.931			
Working hours per week						
0–39	1.00	0.37–2.74	0.999			
40–49	1.00					
50–59	0.87	0.44–1.74	0.698			
60–79	1.80	0.92–3.52	0.086			
≥ 80	1.46	0.68–3.16	0.333			
Job strain						
low				1.00		
medium				2.12	1.10–4.10	0.025
high				3.43	1.72–6.85	< 0.001
Support from supervisors	0.90	0.82–0.99	0.035	0.91	0.82–0.99	0.038
Support from co-workers	0.88	0.79–0.97	0.011	0.88	0.80–0.97	0.013

Adjusted for sex, marital status, clinical experience, place of work, location and specialty. Model 1 – includes days off, night duty, on call, working hours, support from supervisors and support from co-workers. Model 2 – includes job strain, support from supervisors and support from co-workers. Abbreviations as in Table 2.

Table 4 shows the multivariate adjusted odds ratio for burnout. Compared with ≥ 8 days off per month, 2–4 days off per month had significantly higher odds ratios in model 1, and high job strain had significantly higher odds ratios in model 2, as support from co-workers had significant protective odds ratios in all models. In addition to this, the interaction terms between job strain and support from supervisors, and job strain and support from co-workers had no statistical significant results.

DISCUSSION

The purposes of this study were to elucidate whether job strain and job factors affect physicians' mental health, and whether support from supervisors and co-workers has a protective effect on their mental health, and we found significant relationships between job strain and support from co-workers and both depressive symptoms and burnout, and a significant relationship between days off and burnout, among Japanese physicians. The results were consistent with several previous reports [10,36,37].

Table 4. Adjusted odds ratio for burnout

Variable	Model 1			Model 2		
	OR	95% CI	p	OR	95% CI	p
Days off per month						
none or 1	3.61	0.91–14.32	0.068			
2–4	3.69	1.09–12.51	0.036			
5–7	2.10	0.62–7.14	0.236			
≥ 8	1.00					
Night duty shifts per month						
none	1.00					
1	0.43	0.17–1.13	0.087			
2–3	0.67	0.31–1.45	0.310			
4–5	1.09	0.48–2.48	0.828			
≥ 6	0.88	0.35–2.26	0.796			
On call shifts per month						
none	1.00					
1–4	1.23	0.63–2.42	0.542			
5–7	1.23	0.59–2.54	0.585			
≥ 8	1.48	0.75–2.94	0.258			
Working hours per week						
0–39	0.88	0.22–3.52	0.856			
40–49	1.00					
50–59	0.59	0.22–1.55	0.283			
60–79	1.56	0.65–3.74	0.317			
≥ 80	1.74	0.66–4.54	0.259			
Job strain						
low				1.00		
medium				2.49	0.82–7.59	0.109
high				9.38	3.08–28.60	< 0.001
Support from supervisors	0.90	0.80–1.01	0.061	0.90	0.80–1.02	0.098
Support from co-workers	0.84	0.74–0.96	0.008	0.83	0.74–0.95	0.005

Adjusted for sex, marital status, clinical experience, place of work, location and specialty.
Abbreviations as in Tables 2 and 3.

A meta-analysis of general workers has reported that job strain has a significantly higher odds ratio for depression [38]. In a study of German junior doctors, job autonomy was significantly related to depressive symptoms [10]. In a study of Finnish general practitioners, job demand was significantly related to psychological distress assessed using the self-administered 12-item General Health Questionnaire (GHQ-12) [36]. Thus, several studies have reported relationships between demand and control and mental health problems; however, to our knowledge, there

have been few reports on the relationship between job strain itself and mental health problems among physicians. In the present study, job strain was significantly related to depressive symptoms even after controlling for support from supervisors and co-workers. The previous meta-analysis showed that the risk of mental health problems was higher in association with high job strain rather than its constituents, which was speculated to be so because the composite measure captured the adverse work conditions better [38]. Thus, the assessment of physicians' job strain may be a relatively easy-to-use tool for the prevention of physicians' mental health problems.

As previously mentioned, burnout is a significant mental health indicator because physicians with a high risk of burnout tend to have the intention to change jobs [17], be affected by job dissatisfaction [18] and provide low-quality patient care [19,20]. Among dentists, high job strain has a significantly higher odds ratio for burnout [39]. Moreover, significant relationships of job demand and control and each burnout subscale have been reported among nurses [40]. There have also been some reports on the relationship between job strain and burnout among physicians. However, since a significant relationship between job strain and burnout was found in our present study, in addition to a relationship with depressive symptoms, physicians' job strain may be a good assessment tool for the prevention of mental health problems.

A meta-analysis has reported that low support from supervisors and co-workers has significantly higher odds ratios, with almost the same values for stress-related disorders estimated by GHQ-12 and the Checklist of Individual Strength (CIS) (pooled odds ratio = 1.24) [41]. A review of factors affecting U.S. physicians' job satisfaction reported that job support from colleagues was consistently related to job satisfaction in 5 studies, but support from supervisors was not found in the literature search [42]. In our present study, only support from co-workers had a significant association with both depressive symptoms and burnout. Further studies are needed to clarify whether support from co-workers has a greater buffering effect on mental health than support from supervisors.

A recent study of Japanese hospital doctors has reported that a depressive state is positively associated with being on call for more than 5 days per month for men and for more than 8 days per month for women, and is negatively associated with having more than 8 days off per month for men [7]. In our present study, only 2–4 days off per month had a significantly higher odds ratio for burnout. The recent Japanese study had a larger sample size (N = 3862), although it did not control for specialty, marital status, working hours, and social support. The adjusted odds ratio of none or 1 day off per month in our present study was greater than 2, although this was not statistically significant. Therefore, days off may be an important factor for physicians' mental health, as the recent Japanese Hospital study found a significant result.

The adjusted odds ratio for burnout of having none or 1 day off per month was not statistically significant. It has been speculated that physicians have a greater ability to change their stress status because they can easily change hospitals/clinics, compared with other workers in Japan [43]. Thus, the work burden effect may have been attenuated because physicians who were able to work long hours as their nature tended to continue their long work hours.

The effects of on call and night duty were not significant in the adjusted analyses. We did not ask the participants about burdens such as number of patients or sleeping time per duty. The variety of their burden probably attenuated these results.

As previously mentioned, Japanese hospital physicians tend to be affected by long working hours [2,3] and the shortage of some specialties [4], and a recent study of Japanese hospital doctors has reported that a depressive state is negatively associated with having more than 8 days off per month for men [7]. In our present study, only 2–4 days

off per month, job strain and support from co-workers were the statistically significant related factors. Thus, for physicians who feel overworked in Japan, an adequate number of days off is needed. Because of easy accessibility, assessment of job strain and support from co-workers are preferable to prevent mental health problems.

This study has several limitations. First, since this study was cross-sectional, we could not infer cause–effect relationships. Second, the response rate was relatively low. There might have been a tendency of not participating among physicians with greater job stress, which may have attenuated the significance of the results. Moreover, as previously mentioned, the work burden effect may have been attenuated. Also, we cannot present the characteristics of the non-respondents because we had only names and address data when we distributed the questionnaires. Therefore, we cannot present the characteristic differences between respondents and non-respondents. Third, doctors who participated in this study were alumni of one medical university. However, their workplaces (hospitals/clinics) were distributed throughout Japan.

CONCLUSIONS

In conclusion, our results suggest that high job strain is related to depressive symptoms and burnout, and that higher social support, especially that from co-workers, has a buffering effect on depressive symptoms and burnout. Additionally, having an insufficient number of days off is related to burnout. Assessment of job strain may be a good tool to measure physicians' mental health, and a sufficient number of days off may be needed to improve physicians' burnout.

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