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THE ASSOCIATION BETWEEN INDIVIDUAL, PHYSICAL, AND PSYCHOSOCIAL RISK FACTORS AND OCCUPATIONAL FATIGUE AMONG COMMUTER LINE TRAIN WORKERS

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ABSTRACT

Introduction: Occupational fatigue affects workers in various industries including transportation. Commuter train drivers and office workers are subjected to high levels of physical and psychosocial stress, which can lead to occupational fatigue. **Aims:** to examine the relationship between individual, physical, and psychosocial risk factors and occupational fatigue in commuter train workers in Jakarta, Bogor, Tangerang, and Bekasi. **Methods:** Individual (i.e., age, gender, marital status, type of work, duration of work, and smoking status), psychosocial (i.e., effort, reward, overcommitment, monotonous work, social support, job satisfaction, and work stress) factors, and occupational fatigue were investigated in 78 commuter line train workers (both drivers and officers). Observing workers' activities yielded physical factors (awkward posture, repetitive work, prolonged work, and material manual handling activities). The association between each risk factor and occupational fatigue was investigated using a logistic regression model. **Results:** Commuter line officers (OR 4.96, 95% CI 1.77 – 13.85), those with high overcommitment (OR 3.16, 95% CI 1.25 – 8.00), and those with high work stress (OR 1.54, 95% CI 1.19 – 2.00) were more likely to report occupational fatigue than train drivers, who reported low overcommitment and low work stress, respectively. When compared to those who reported low job satisfaction, those who reported high job satisfaction were less likely to report occupational fatigue (OR 0.19, 95% CI 0.07 – 0.52). **Conclusion:** Job position, overcommitment, and work stress were associated with occupational fatigue.

Keywords: fatigue, stress, shift work, psychosocial

INTRODUCTION

Fatigue is a state of feeling tired and sleepy because of prolonged mental and physical work, continued anxiety, work environment factors, and loss of sleep (Sadeghniiat-Haghighi and Yazdi, 2015). Fatigue is the result of prolonged mental or physical work and can affect performance and interfere with alertness, resulting in errors (Health and Safety Executive, UK, 2006). Occupational fatigue refers to fatigue conditions related to workload. Occupational fatigue affects workers in various industries including transportation. More than 32% of workers experience sleep disorders that may be linked to occupational fatigue (Choobineh, Javadpour et al., 2018). A previous research among a total sample of 206 commuter rail driver and rail traffic officers, more than half reported experience of fatigue during night shifts (Harma, Sallinen et al., 2002). In addition, the two-week prevalence of fatigue among the US workforce (Ricci, Chee et al., 2007). The prevalence of fatigue, assessed using a critical flicker fusion analyzer, was 32.32% among chemical transportation drivers (Phatrabuddha, Yingratanasuk et al., 2018).

Occupational fatigue has become a major concern as a risk factor for accidents and absences from work. (Lerman, Eskin et al., 2012, Widanarko and Modjo, 2017). A Canadian investigation of 18 accidents found that the fatigue of freight railway operating employees contributed to the occurrence of accidents (Rudin-Brown, Harris et al., 2019). Additionally, fatigue has been reported to be associated with short-term cognitive and physical

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deprivation, which may cause errors or injuries (Techera, Hallowell et al., 2016). Occupational fatigue also impacts the economy. In the United States, healthcare costs due to occupational fatigue total $136.4 billion (Ricci, Chee et al., 2007). A study in the US involving 28,902 adults showed that fatigue was associated with health-related lost productive time (Ricci, Chee et al., 2007).

Occupational fatigue involves various risk factors, including individual, physical, psychosocial, environmental, and work organizations (Widanarko and Modjo, 2017). Individual factors include age, length of service, sex, body mass index (BMI), and smoking habits (Bazazan, Rasoulzadeh et al., 2014, WSH Council, 2010). Physical factors related to fatigue include awkward posture, static muscle work, long duration of work, manual handling of loads, and repetitive movements (Sadeghniiat-Haghighi and Yazdi, 2015, Widanarko and Modjo, 2017). Psychosocial and organizational factors related to fatigue include poor shift work arrangements, long working hours, overcommitment, high work demands, low job control, low social support, dissatisfaction with work, monotonous work, and job stress (Harma, Sallinen et al., 2002, Sadeghniiat-Haghighi and Yazdi, 2015, Widanarko and Modjo, 2017). Noise, vibration, lighting, humidity, and temperature have been found to be associated with occupational fatigue as environmental factors (Sadeghniiat-Haghighi and Yazdi, 2015, Techera, Hallowell et al., 2016, Widanarko and Modjo, 2017).

A systematic review and meta-analysis found that workers with sleep problems have a higher risk of injury than those without sleep problems (Uehli, Mehta et al., 2014). Employees of freight rail companies reported not getting enough sleep due to shift schedules, which may also contribute to sleep-related fatigue by limiting sleep opportunities (Rudin-Brown, Harris et al., 2019). Several accident reports have also indicated that fatigue and poor shift schedules are major contributors to serious rail accidents (Harma, Sallinen et al., 2002). Based on data from the Ministry of Transportation of the Republic of Indonesia in 2015-2019 on the trend of train accidents in Indonesia in, 2015 there were 55 train accidents; in 2016 and 2017, the number of train accidents decreased to 15 and 11 accidents in 2019, respectively (Directorate General of Railways Ministry of Transportation, 2020). Incident investigations showed that 33% of railway accidents in Indonesia between 2010 and 2016 were due to human factors (National Transportation Safey Committee, 2016).

Although many studies have investigated the risk factors for occupational fatigue, less is known about the association between work-related risk factors and occupational fatigue in developing countries, particularly in the transportation industry. As a result, the purpose of this study is to look into the relationship between individual, physical, and psychosocial risk factors and occupational fatigue among commuter train workers in Jakarta, Bogor, Tangerang, and Bekasi.

METHODS

The present study was conducted at a commuter line train company in Jakarta in 2018. Seventy-eight commuter line train workers (49 drivers and 29 officers based on their job title) participated in the present study. They were then randomly selected. This study employed a cross-sectional research design using a quantitative approach. Information on individual (i.e., age, gender, marital status, type of work, duration of work, and smoking status) and psychosocial factors such as effort (Siegrist, Wege et al., 2008), reward (Siegrist, Wege et al., 2008), overcommitment (Siegrist, Wege et al., 2008), monotonous work (Karasek, Choi et al., 2007), social support from supervisors, co-workers, and families (Karasek, Choi et al., 2007), job satisfaction

(NIOSH, 2002), and work stress (NIOSH, 2002) were gathered using a set of validated self-administered questionnaires. The Swedish Occupational Fatigue Inventory (SOFI) was used to examine occupational fatigue (Lundh Hagelin, Wengström et al., 2009). The SOFI was developed to measure five subjective dimensions of work-related fatigue: lack of energy, physical exertion, physical discomfort, lack of motivation, and sleepiness (Lundh Hagelin, Wengström et al., 2009). All psychosocial factors and fatigue questions had answer alternatives of strongly agree (scored as 1), agree (scored as 2), disagree (scored as 3), and strongly disagree (scored as 4). The average score for each psychosocial factor and fatigue was used as the final score. The median score was used as a cut-off point to determine low or high psychosocial exposure or fatigue. All questions were valid (r-count>r-table) and reliable (internal consistency was good, with Cronbach's alpha coefficients > 0.7).

Physical factor data (awkward posture, repetitive work, prolonged work, and material manual handling activities) were collected by observing the workers' activities while using the Quick Exposure Check form (David, Woods et al., 2008) to determine the level of musculoskeletal disorder risk (low/medium/high) in particular body regions, that is, the back, shoulder/arm, wrist, and neck. The association between each risk factor (individual, physical, and psychosocial) and occupational fatigue was investigated using bivariate logistic regression analysis. Odds ratios and 95% confidence intervals (CI were used to assess the strength of the relationship between risk factors and occupational fatigue. Odds ratios (and their 95 percent confidence intervals) greater than one were considered risk factors, whereas odds ratios less than one were considered protective factors. Ethics approval for the present study was obtained from the Faculty of Public Health, Universitas Indonesia (No. 147/UN2. F10/PPM.00.02/2018).

RESULT

This study included 78 commuter line train workers (49 drivers, 29 officers). Of 78 commuter line train workers, 52% reported occupational fatigue. In detail, 39% of the drivers reported occupational fatigue, whereas 76% reported occupational fatigue. The distribution of the participants based on individual, physical, and psychosocial factors is shown in Table 1.

Table 1. Distribution of participants based on individual, physical, and psychosocial factors

Risk factors	**n**	**%**
Individual factors		
Age		
<27	36	46
≥27	42	54
Gender		
Woman	7	9
Man	71	91
Marital status		
Single	31	60
Married	47	40
Type of work		
Driver	49	63
Officer	29	37
Years of work		
<5 years	39	50
≥5 years	39	50
Sleep duration		
≥ 6 hours	40	51
< 6 hours	38	49
Shift work		
Morning	53	68
Day	14	18
Night	11	14
Smoking status		
No	59	76
Ex-Smoker	4	5
Yes	15	19
Physical factors		
Back		
Low risk	24	30
Medium risk	43	55

Risk factors	**n**	**%**
High risk	11	14
Shoulder/Arm		
Low risk	26	34
Medium risk	24	30
High risk	28	36
Wrist		
Low risk	26	34
Medium risk	52	66
High risk	0	0
Neck		
Low risk	0	0
Medium risk	24	30
High risk	54	70
Psychosocial factors		
Effort		
Low	38	49
High	40	51
Reward		
Low	22	28
High	56	72
Overcommitment		
Low	37	47
High	41	53
Monotonous work		
Low	16	21
High	62	79
Co-worker support		
Low	16	21
High	62	79
Supervisor support		
Low	11	14
High	67	86
Family support		
Low	35	45
High	43	55
Job satisfaction		
Low	37	47
High	41	53
Work stress level		
Low	37	47
High	41	53

Details of the distribution of physical and psychosocial risk factors by type of work (commuter line train drivers and officers) are shown in Tables 2 and 3, respectively.

Table 2. Distribution of physical risk factors by type of work (drivers and officers)

Physical factors	**Drivers**						**Officers**					
	Low		**Medium**		**High**		**Low**		**Medium**		**High**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Back	12	24	28	57	9	18	12	41	15	52	2	7
Shoulder/ Arm	13	26	15	31	21	43	13	45	9	31	7	24
Wrist	13	26	36	73	0	0	13	45	16	55	0	0
Neck	0	0	12	24	37	75	0	0	12	41	17	59

Table 3. Distribution of psychosocial risk factors by type of work (drivers and officers)

Psychosocial factors	**Drivers**				**Officers**			
	Low		**High**		**Low**		**High**	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Effort	31	63	18	37	7	24	22	76
Reward	15	31	34	69	7	24	22	76
Overcommitment	30	61	19	39	7	24	22	76
Monotonous work	5	10	44	90	11	38	18	62
Co-worker support	9	18	40	82	7	24	22	76

Psychosocial factors	Drivers				Officers			
	Low		High		Low		High	
	n	%	n	%	n	%	n	%
Supervisor support	4	8	45	92	7	24	22	76
Family support	21	43	28	57	14	48	15	52
Job satisfaction	29	59	20	41	8	28	21	72

Individual, physical, and psychosocial risk factors

Almost half of the participants were aged <27 years, 91% were male, and 60% were single. Most participants were train drivers (60%). In terms of years of work, half of the participants had worked for more than 5 years. In addition, 68% were morning shift workers, and 51% reported that the average duration of sleep was ≥ 6 h every night. Most participants (76%) were nonsmokers (Table 1).

The results of the observation for physical factors showed that, in general, 14%, 36%, and 70% of participants had a high risk in the back, shoulder/arm, and neck regions, respectively. Whereas 66% of participants had medium risk in the wrist region, approximately 51%, 53%, and 79% of participants reported high effort, overcommitment, and monotonous work, respectively. In contrast, 72% of the participants reported high rewards, and 79% and 86% reported high co-worker support and supervisor support, respectively. More than half of the participants reported high levels of work-related stress (Table 1).

Commuter line train drivers had a higher proportion of those who had a high risk in the back (18% *vs* 7%), shoulder/arm (43% *vs* 24%), and neck regions (75% *vs* 59%) than officers (Table 2). Commuter line train officers seemed to be more exposed to psychosocial risk factors than commuter line train drivers. The findings were particularly for effort (76% *vs* 37%) and overcommitment (76% *vs* 39%). In addition, although 90% of commuter line train drivers reported highly monotonous work, more than 80% reported high support from co-workers and supervisors. In contrast, more commuter line train officers reported that their job was satisfied (72%) than commuter line train drivers (41%) (Table 3).

The association between individual, physical, and psychosocial factors, and occupational fatigue

The results of the bivariate logistic regression (Table 4) showed that only individual (i.e., type of work) and psychosocial (i.e., overcommitment, job satisfaction, and work stress) factors were associated with occupational fatigue. None of the physical factors was associated with occupational fatigue. Commuter line train officers were more likely than commuter line train drivers to report occupational fatigue (OR 4.96, 95 percent CI 1.77 – 13.85). Furthermore, those with high over-commitment (OR 3.16, 95 percent CI 1.25–8.00) and high work stress (OR 1.54, 95 percent CI 1.19–2.00) were more likely to report occupational fatigue than those with low over-commitment and low work stress. In contrast, those who reported their job to be highly satisfied were less likely (OR 0.19, 95% CI 0.07 – 0.52) to report occupational fatigue than those who reported their job to be less satisfied. Although ex-smokers (OR 15.00, 95% CI 1.83 – 122.45) were more likely to report occupational fatigue than non-smokers, the wide confidence interval showed the possibility of bias due to the small number of patients in this group. Hence, this risk factor was not significantly associated with occupational fatigue.

Table 4. The association between individual, physical, and psychosocial factors and occupational fatigue

Risk factors	n	Occupational fatigue			
		no of cases	%	OR	(95% CI)
Individual factors					
Age					
<27	36	19	53	1.00	
≥27	42	22	52	0.98	0.40 – 2.40
Gender					
Woman	7	6	86	1.00	
Man	71	35	49	0.16	0.01 – 1.41
Marital status					
Single	31	17	55	1.00	
Married	47	24	51	0.85	0.34 – 2.13
Type of work					
Driver	49	19	39	1.00	
Officer	29	22	76	**4.96**	**1.77 – 13.85**
Years of work					
<5 years	39	22	56	1.00	
≥5 years	39	19	49	0.73	0.30 – 1.79
Sleep duration					
≥ 6 hours	40	17	42	1.00	
< 6 hours	38	24	63	2.31	0.93 – 5.76
Shift work					
Morning	53	30	57	1.00	
Day	14	7	50	0.76	0.23 – 2.49
Night	11	4	36	0.43	0.11 – 1.67
Smoking status					
No	59	27	46	1.00	
Ex-Smoker	4	1	25	15.00	1.83 – 122.45
Yes	15	13	87	N/A	N/A
Physical factors (level of musculoskeletal disorders risk at particular body part)					
Back					
Low	24	10	42	1.00	
Medium	43	25	58	1.94	0.70 – 5.35
High	11	6	54	1.15	0.39 – 7.07
Shoulder/Arm					
Low	26	11	42	1.00	
Medium	24	11	46	0.34	0.37 – 3.59
High	28	19	68	2.87	0.94 – 8.74
Wrist					
Low	26	11	42	1.00	
Medium	52	30	58	1.86	0.71 – 4.82
High	0	0			
Neck					
Low	0	0			
Medium	24	10	42	1.00	
High	54	31	57	1.88	0.71 – 5.00

Risk factors	n	Occupational fatigue			
		no of cases	%	OR	(95% CI)
Psychosocial factors					
Effort					
Low	38	17	45	1.00	
High	40	24	60	1.85	0.75 – 4.55
Reward					
Low	22	12	54	1.00	
High	56	29	52	0.89	0.33 – 2.40
Overcommitment					
Low	37	14	38	1.00	
High	41	27	66	**3.16**	**1.25 – 8.00**
Monotonous work					
Low	16	10	62	1.00	
High	62	31	50	0.60	0.19 – 1.85
Co-worker support					
Low	16	11	69	1.00	
High	62	30	48	0.42	0.13 – 1.37
Supervisor support					
Low	11	9	82	1.00	
High	67	32	48	0.20	0.04 – 1.01
Family support					
Low	35	21	60	1.00	
High	43	20	46	0.58	0.23 – 1.43
Job satisfaction					
Low	37	12	32	1.00	
High	41	29	71	**0.19**	**0.07 – 0.52**
Work stress level					
Low	37	14	38	1.00	
High	41	27	66	**1.54**	**1.19 – 2.00**

95% CI = 95% Confidence Interval

DISCUSSION

The association between individual factors and occupational fatigue

The type of work (drivers vs. officers) was the only individual factor associated with occupational fatigue. The type of work consisted of commuter line train drivers and officers. Based on these results, the percentage of fatigue was higher in officers (76%) than in drivers (39%). The results of the bivariate logistic regression analysis using the SOFI fatigue questionnaire showed that there was a significant association between the type of work and the incidence of fatigue, as evidenced by the OR of 4.96 with 95% CI 1.77 – 13.85, from which it can be said that officers had a risk of fatigue 4.96 times higher than that of drivers. The results of the present study differ from those of a previous study (Pramasari, Widjasena et al., 2017). Pramasari's study showed that commuter line train drivers had a higher risk of fatigue. Commuter line train drivers were reported to have extended working hours (overtime), an early morning work shift, which starts at 3:00 am, the need for a high level of vigilance, and the existence of long and monotonous travel routes.

However, as occupational fatigue is multifactorial, there may be risk factors that contribute to occupational fatigue. Commuter line train drivers were more likely to be exposed to physical factors, and

none of these physical factors were significantly associated with occupational fatigue. In contrast, the present study showed that psychosocial factors, such as overcommitment, were strongly associated with occupational fatigue (odds ratio [OR] 3.16, 95% CI 1.25 – 8.00). Most commuter line train officers (76%) reported high overcommitment compared with commuter line train drivers (39%). This may explain why commuter line train officers were more likely to report occupational fatigue than commuter line train drivers.

The present study did not find an association between age and occupational fatigue. The rationale for this finding is that the cut-off point of the age group may be too low (27 years). As a result, both age groups seemed to be relatively young. Hence, occupational fatigue can quickly recover. The results of the present study were not in line with previous studies that found an association between age and occupational fatigue (Harma, Sallinen et al., 2002). A study conducted on train drivers and traffic control showed that train drivers aged <43 years experienced more fatigue during the morning shift than drivers aged >43 years (Harma, Sallinen et al., 2002).

The present study failed to find an association between gender and occupational fatigue. This may be because the sample was dominated by males (91%). Work duration was not associated with occupational fatigue. This finding is consistent with that of a previous study that examined the risk factors for work-related fatigue among Indonesian miners (Widanarko, Modjo et al., 2018). No association was found between sleep duration and occupational fatigue in the present study. This might be the cutoff point used (i.e., 6 h) to determine the low/high exposure group. A previous study among Australian rail industry workers (*n*=90) suggested that sleeping for less than 5 hours significantly increased the likelihood of work-related fatigue.

The work schedule (shift) for the commuter rail driver was adjusted according to the train schedule. The engineers' schedule is rotated every day, as is the train's travel route. The machinists' schedule lasts from 3:00 a.m. to 2:00 a.m., with a work duration ranging from to 5-7 hours per day, which is also influenced by the flow of train traffic. Although the present study failed to show an association between shift work and occupational fatigue, the percentage of occupational fatigue was higher in commuter line train workers with morning work schedules (57%) than in commuter line train workers with day and night work schedules. Similarly, previous studies have shown a significant association between work shifts and the occurrence of occupational fatigue (Harma, Sallinen et al., 2002). Harma, Sallinen et al. (2002) showed that those who worked in the morning had a higher risk of working in the afternoon, night, and day shifts.

The association between physical factors and occupational fatigue

The physical risk factors in this study included the risk of musculoskeletal disorders in the back, shoulders, arms, wrists, and neck. The observation results are presented as in total (commuter line train workers, (Table 1), as well as separately for commuter line train drivers and officers (Table 2) due to different work characteristics for both types of work. These differences may result in different levels of musculoskeletal risk for specific body regions. Commuter line train drivers had a higher proportion of those who had a high risk in the back (18% *vs* 7%), shoulder/arm (43% *vs* 24%), and neck regions (75% *vs* 59%) than officers (Table 2). This is because the commuter line trains drivers' activities while operating the commuter line train were exposed to physical exposure, such as back bending forward, back twisted, and neck bending forward for a long period (almost 7 h per day). However, the results of the analysis of the association between physical risk factors and occupational fatigue showed

that there was no significant association between physical risk factors related to the back, shoulders, arms, wrists, or neck and the occurrence of occupational fatigue in workers. Further studies are required to confirm this association.

The association between psychosocial factors and occupational fatigue

Previous studies have identified psychosocial factors as predictors of occupational fatigue. According to one study, while the relationships between psychosocial factors and fatigue vary, psychological job demands and skill discretion are strongly associated with fatigue among registered nurses (Parhizi, Steege et al., 2013). Another previous study found that work-related chronic fatigue was strongly associated with stress, trust in management, decision latitude, self-rated health, and work-family conflict (Rahman, Abdul-Mumin et al., 2016). Similarly, psychosocial factors (burnout, self-rated health, over-commitment, trust in management, and threat of violence) were also found to be associated with acute occupational fatigue.
(Rahman, Abdul-Mumin et al., 2016). Thus, the results of the present study are consistent with those of previous studies.

The descriptive results of the present study show that the proportion of occupational fatigue was higher in the high psychosocial risk group than in the low psychosocial risk group (Table 3). However, only over-commitment, job satisfaction, and work stress were significantly associated with occupational fatigue (Table 4). The proportion of people experiencing occupational fatigue was higher in the high over-commitment group than in the low over-commitment group. There was a significant association between overcommitment and the occurrence of occupational fatigue, as evidenced by an OR of 3.16, 95% CI of 1.25 – 8.00. This means that commuter line train workers with a high overcommitment to work had a risk of occupational fatigue 3,16 times higher than those with low overcommitment.

The results of this study are in accordance with those of Widanarko and Modjo (2017), who found a significant association between over-commitment and the occurrence of work-related fatigue. In the present study, a high level of overcommitment was a risk factor for work-related fatigue. Commuter line train officers were reported to have a high level of over-commitment. In contrast, 61% of the commuter line train drivers reported a low level of overcommitment. Overcommitment was also found to be associated with acute occupational fatigue in a previous study (Rahman, Abdul-Mumin et al., 2016).

Social support from coworkers, supervisors, and family members constitutes psychosocial factors of social support. The current study found that workers with low social support from coworkers, supervisors, or families experienced more occupational fatigue than those with high social support from coworkers, supervisors, or family members. However, there was no significant relationship between social support from coworkers, supervisors, or family members and occupational fatigue. In contrast, a previous study showed that supervisor support can play a role as a risk factor for occupational fatigue. Research conducted by Liu and Aungsuroch (2019) showed that social support directly influences work stress and burnout. In turn, this condition may cause occupational fatigue. Another study found that social support can act as a buffer in the association between workload and work pressure (Huynh, Xanthopoulou et al., 2013).

Job satisfaction was a significant protective factor against occupational fatigue, as demonstrated by an OR of 0.19 with a 95% CI 0.07 – of 0.52. This means that workers with high job satisfaction were protected 0.19 times more than workers with low job satisfaction. This result is consistent with previous research conducted

by Baeriswyl, Krause et al. (2016), and Rosales, Labrague et al. (2013), who found that there was a negative association between job satisfaction and the occurrence of exhaustion or burnout. In fact, a meta-analytic study discussed fatigue and job satisfaction as major determinants of safety (Nahrgang, Morgeson et al., 2011). This may indicate that job satisfaction is a buffer for poor psychosocial conditions.

Work stress was significantly associated with fatigue, as evidenced by an OR of 1.54 with 95% CI of 1.19 – 2.00. This implies that workers with high stress levels had a risk of occupational fatigue of 1.54 times higher than workers with low stress levels. These results are consistent with those of Jacobs et al. (2015), who investigated the association between work stress and occupational fatigue among office workers. Similarly, Mamusung et al. (2019) found that work stress was positively associated with occupational work-related fatigue among officers. This finding shows that interventions to reduce occupational fatigue should also address work-related stress issues in the workplace.

The strength of the present study is the use of a valid and reliable questionnaire. Hence, these results are expected to be valid. However, this study has a few limitations. First, the cross-sectional study methods were unable to draw firm conclusions on the cause–effect of the variables, only the association between variables. Second, variables that may also influence the occurrence of fatigue were not included. These are environmental factors, nutrition, and activities at home.

CONCLUSIONS

The present study showed that approximately 52% of the commuter line workers reported occupational fatigue. In detail, 39% of the drivers reported occupational fatigue, whereas 76% reported occupational fatigue. Individual (i.e., type of work) and psychosocial (i.e., overcommitment, job satisfaction, and work stress) factors were significantly associated with occupational fatigue. Commuter line train officers were more likely to report occupational fatigue than commuter line train drivers. Furthermore, those who reported high overcommitment and work stress were more likely to report occupational fatigue than those who reported low overcommitment and work stress. Those who reported high job satisfaction were less likely to report occupational fatigue than those who reported low job satisfaction were. None of the physical factors was associated with occupational fatigue. This study implies that a fatigue management system should be developed not only for commuter line train drivers, but also for officers. The results suggest that interventions to reduce the prevalence of occupational fatigue include improving psychosocial conditions (i.e., lower overcommitment, high job satisfaction, and managing work stress) with a focus on commuter line officers. More research is needed to establish a clear link between occupational fatigue and individual, physical, and psychosocial risk factors.

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