

Occupational Risk Factors for Acute Fatigue Symptoms among Indonesian Beverage Industry Workers

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Abstract

Fatigue is a common problem among working population. However, little is known about the association between occupational risk factors and acute fatigue symptoms, particularly in those working in developing countries. The study aims to identify occupational risk factors for acute fatigue symptoms among Indonesian beverage industry workers. Using validated self-administered questionnaires, 173 Indonesian beverage industry workers in various occupations (machine operator, forklift operator, salesmen/riders, and drivers) reported individual (age, gender, years of work, occupation, and smoking status), physical (working in sitting position, hand above shoulder, bent trunk, using vibrating hand tools, whole body vibration and lifting), psychosocial (effort, reward, over commitment, job satisfaction and work stress), and organisational (employment status and shift work) work factors. Acute fatigue symptoms was assessed by 5 validated questions using 7-likert scale, scored 0 to 6. A final acute fatigue symptoms calculated as the sum of score to the 5 questions, divided by 30, then multiplied by 100. These data were analysed by multivariate linear regression. Acute fatigue symptoms was associated with occupations, i.e. salesmen/riders (11.00, 95% CI 4.03-17.96) and drivers (7.36, 95% CI 0.76-13.95), sitting >4 hours per day (7.92, 95% CI 2.18-13.65), lifting >20kg (17.40, 95% CI 8.19-26.60), low over commitment (-7.49, 95% CI -12.23 – (-2.74), and work stress (15.26, 95% CI 5.28-25.25). Interventions to reduce acute fatigue symptoms should be applied to both physical (sitting and lifting) and psychosocial factors (over commitment and work stress) with focus on salesmen/riders and drivers.

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Introduction

Fatigue is a common problem among working population and also a major concern due to its consequences. Previous review study has shown that brief periods of fatigue (i.e., less than one month duration) are common occur in approximately 15% to 25% of the population.¹ Whereas the prevalence of fatigue among 1883 medical personnel in Taiwan was 31%.² Fatigue is reported to be a risk factor for accidents³ and sickness absence.⁴

There are several factors that known to be associated with fatigue. They are job demands, psychosocial factors, and individual

factors.⁵ Previous studies have identified job demands as shift work,⁶ working hours,⁷ psychological demand,^{6,8,9} and physical demand.^{6,8,9} Psychosocial factors include decision latitude,^{6,8} social support,¹⁰ job insecurity,⁸ effort,⁸ reward,^{6,8,10} job satisfaction,⁸ and work stress,⁷ whereas individual factors include age,⁸ gender,⁸ education level,⁸ health status,^{2,9} coping capacities,⁵ and motivation.⁵

Although many studies have been investigated the risk factors for fatigue, little is known about the association between occupational risk factors and acute fatigue symptoms, particularly in those working in developing countries.

Methods

The study was conducted in a beverage company in Indonesia. There were 300 on-duty employees (machine operator, forklift operator, salesmen/riders, and drivers) in distribution

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centers in Pulogadung, Jakarta and Makassar and production plant in Cibitung, Bekasi. They were invited to fill out a self-administered questionnaire on individual (age, gender, years of work, occupation, and smoking status), physical and psychosocial factors, organisational (employment status and shift work) and acute fatigue symptoms. Of the 300 workers invited, 200 workers participated.

For physical factors, participants were asked how much working time during their work activities they were involved in any of these situations: sitting position;¹¹ trunk bent;¹¹ hand above shoulder;¹¹ using vibrating tools and exposure to whole body vibration;¹² also whether their work involved handling weight.¹³ Psychosocial exposures were assessed using the short version of the Effort-Reward Imbalance (ERI) Questionnaire,¹⁴ Copenhagen Psychosocial Questionnaire II (COPSOQ II)¹⁵ and a work stress question.¹³ Acute fatigue symptoms were assessed by 5 validated questions using 7-likert scale, scored 0 to 6. A final acute fatigue symptoms calculated as the sum of score to the 5 questions, divided by 30, then multiplied by 100.¹⁶ To examine the association between physical and psychosocial factors and acute fatigue, a multiple linear regression analysis was applied. All statistical analyses were conducted using R.¹⁷

Results

Of 200 participants, only 173 data were valid and analysed. Twenty-seven data were excluded due to incomplete or missing data. Of the 173 valid questionnaire, 40% were drivers, 27% were salesmen/riders, 16% were forklift operators, and 16% were machine operators. About 23% of respondents were <28 year, 24% were in 28-34 year age group, 27% of respondents were 35-41 year age group, and 26% were >41 year. The distribution of duration of work were less than four years (28%), 4 to 9 years (25%), 10 to 16 years (21%), and >16 years (26%).

The multiple linear regression model shows that occupations (salesmen/riders and drivers), sitting posture, lifting >20 kg, low over commitment, and work stress were significantly associated with acute fatigue symptoms (Table 1). Whereas age, years of work, smoking status, shift work, employment status, duration of trunk

bent, hands above shoulders postures, whole body vibration, using hand tools, effort, reward, and job satisfaction were not associated with acute fatigue symptoms.

Variables	Estimate	95% CI	SE	P-value
Individual Factors				
Occupations:				
Machine operators	Ref	Ref	Ref	Ref
Forklift operators	-1.991	-10.778 – 6.797	4.44 9	0.655
Salesmen /Riders	11.003	4.036 – 17.969	3.38 9	0.0022**
Drivers	7.361	0.769 – 13.954	3.33 8	0.029*
Physical Factor:				
Sitting				
Never/<1 hour per day	Ref	Ref	Ref	Ref
1 – 4 hours per day	11.420	5.522 – 17.318	2.98 6	0.0002***
>4 hours per day	7.922	2.189 – 13.655	2.90 3	0.007**
Lifting				
Never	Ref	Ref	Ref	Ref
Light ≤5 kg	3.610	-4.852 – 12.072	4.28 4	0.401
Moderate 6 – 10 kg	3.846	-4.528 – 12.221	4.24 0	0.366
Heavy 11 – 20 kg	2.818	-5.533 – 11.169	4.22 8	0.506
Very heavy > 20 kg	17.403	8.196 – 26.609	4.66 1	0.0003***
Psychosocial Factors:				
Low over commitment	-7.494	-12.239 – (-2.748)	2.40 3	0.002**
Stress				
Never stress	Ref	Ref	Ref	Ref
Mildly Stress	10.812	5.359 – 16.264	2.76 1	0.0001***
Moderately Stress	15.366	9.234 – 21.498	3.10 5	1.89e ⁻⁰⁶ ***
Stressful	15.267	5.284 – 25.250	5.00 5	0.003**
Very Stressful	9.190	-0.006 – 18.386	4.65 5	0.050

Table 1. The Final Model of the Association Between Individual, Physical and Psychosocial Factors and Acute Fatigue Symptoms. *CI* Confidence Interval; *SE* Standard Error; *Ref* Reference category. **P*<0.05; ***P*<0.01; ****P*<0.001

Discussion

The present study found that salesmen/riders, drivers, sitting posture, lifting >20 kg, and work stress significantly increased the acute fatigue symptoms reported, whereas low over commitment significantly decreased the acute fatigue symptoms reported. Our findings of sitting posture and lifting >20 kg as risk factors for fatigue are in agreement with previous studies.⁹ The finding of work stress as a risk

factor for fatigue is in also supported by a previous study that included large representative sample.⁷ This finding shows that work stress is tiring, whereas low over commitment seems to be protective.

The main task of salesmen/riders was to sell the products to many customers or stores. Most stores were located quite closed each other. This condition made the salesmen/riders had to stop and get off from the motorcycle frequently which may be tiring. In addition, sales also had to achieve sales target which may lead to work stress. For drivers, their tasks were delivered good and handling goods. Both activities are physically (and mentally) demanding. Based on explanation above, the work characteristics of salesmen/riders and drivers may explain the positive association between these two occupations and acute fatigue symptoms.

Conclusion

The present study reported that physical (prolonged sitting and heavy lifting) and psychosocial factors (work stress) were positively associated with acute fatigue symptoms while low over commitment seem to be protective. Interventions to reduce acute fatigue symptoms in this workplace should be applied to both physical and psychosocial factors with focus on salesmen/riders and drivers.

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