

Abstract

Fatigue as a Predictor of Medical Utilization, Occupational Accident and Sickness Absence

Sei-Jin Chang, Sang-Baek Koh, Dongmug Kang¹⁾, Seong-Ah Kim²⁾,
Jin-Joo Chung³⁾, Chul-Gab Lee⁴⁾, Myung-Geun Kang⁵⁾, Sook-Jung Hyun,
Jung-Jin Cho, Bong-Suk Cha, Jong-Ku Park

Department of Preventive Medicine and Institute of Occupational Medicine, Wonju College of Medicine, Yonsei University

Department of Preventive and Occupational Medicine, College of Medicine, Pusan University¹⁾

Department of Occupational and Environmental Medicine, Pocheon CHA University²⁾

Korean Women's Development Institute³⁾

Department of Occupational Medicine, College of Medicine, Chosun University⁴⁾

Department of Preventive Medicine, College of Medicine, Chosun University⁵⁾

Department of Family Medicine, Hallym University College of Medicine⁶⁾

Objectives: This study examined the relationship of fatigue to medical utilization, occupational accident and sickness absence.

Subjects and Methods: Data were obtained from the National Study for Development and Standardization of Occupational Stress (NSDSOS Project, 2002~2004). A total of 30,146 employees categorized within the Korean Standard Industrial Classification and the Korean Standard Occupational Classification were recruited. A structured-questionnaire was used to assess the participants' sociodemographics, job-related factors, health-related behaviors, personality trait, self-perceived fatigue (MFS) and the frequency of medical utilization, occupational accident and sickness absence. Data on medical utilization and occupational accident were confirmed from company health records. Chi-square test and logistic regression analysis were used to elucidate the relationship of self-perceived fatigue to medical utilization, occupational accident and sickness absence.

Results: In logistic regression analyses, self-perceived fatigue was associated with medical utilization (outpatient), occupational accident and sickness absence although the strength of the associations was higher in the blue collar workers except for medical utilization. For medical utilization, the white collar

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: (Tel: 033-741-0343) E-mail: chang@wonju.yonsei.ac.kr

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workers' adjusted odds ratios of outpatient utilization for workers scoring in the third quartile and the highest quartile, compared to workers scoring in the lowest quartile were 1.50 (95% CI: 1.20-1.87) and 2.16 (95% CI: 1.69-2.75), respectively. The blue collar workers' adjusted odds ratios of outpatient utilization for workers scoring in the second (OR: 1.23, 95% CI: 1.06-1.43), third (OR: 1.42, 95% CI: 1.22-1.66) and highest quartile (OR: 1.83, 95% CI: 1.55-2.17), respectively, compared to workers scoring in the lowest quartile were statistically significant. However, no associations were found between fatigue and inpatient utilization for either the white or blue collar workers. The blue collar workers' adjusted odds ratios of being injured for workers scoring in the second, third and highest quartile were 1.41 (95% CI: 1.00-2.00), 1.57 (95% CI: 1.10-2.22) and 2.41 (95% CI: 1.69-3.44), respectively, compared to those scoring in the lowest quartile, but, those of the white collar workers were not significant. There was more likely to an increased risk of sickness absence in workers scoring in the second, third and highest quartile compared to those scoring in the lowest quartile in both white and blue collar workers, but the magnitudes of risk were higher in the blue collar workers than the white collars workers.

Conclusion: This result suggests that fatigue is a determinant predictor of medical utilization, occupational accident and sickness absence, and that the pattern of risks for the three outcomes differs according to the occupational type. Some limitations of this study and considerations for future study were also discussed.

Key Words: Fatigue, Medical utilization, Occupational accident, Sickness absence.

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가 1.2 ~ 1.7 (David et al, 1990; Lewis & Wessely, 1992; Pawlikowska, 1994; Fuhrer & Wessely, 1995), 가 (Chen, 1986; David et al, 1990; Shefer et al, 1997; Wessely et al, 1997; Loge et al, 1998).

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(A National Study for Development and Standardization of Occupational Stress: NSDSOS Project, 2002~2004) ’

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FAI(Fatigue Assessment Inventory) (2000) 19

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5) (, ,) (, , ,) , (, , ,) (A) (Haynes et al, 1978)

3. , X2 (,), 95% (quartile) SPSSWIN(version 11.0)

1. 가 84% (16%) , 30 (43.5%) 가 20 (24.6%) 40 (24.0%) 가 40%가 (72.2%) 가 , 7,611 (25.9%) (Table 1).

2. : , , 5 (52.3%) (47.8%) (50.6%), 5 (50.7%) , 40 (48.0%)가 40 (44.7%) (49.5%), A 가 (48.7%)가

Table 1. General characteristics of study subjects*

Dimension	N	(%)
Gender		
Male	24,871	(84.1)
Female	4,716	(15.9)
Age		
20~29	6,660	(24.5)
30~39	11,788	(43.5)
40~49	6,496	(24.0)
50~59	2,050	(7.6)
60~	105	(0.4)
Education		
Middle school	2,377	(10.0)
High school	11,845	(50.4)
College	9,335	(39.6)
Marital status		
Unmarried	7,611	(25.9)
Married	21,216	(72.3)
Divorced/Separated/Widowed	541	(1.8)

* Statistical tests were calculated after excluding missing values

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(23.8%) (Table 2). 가

Table 2. Distributions of medical utilization, occupational accident and sickness absence by job-related characteristics

N(%)*

Dimension	Outpatient	Inpatient	Occupational accident	Sickness absence
Occupational type				
White collar	3,248 (52.3)	476 (7.7)	212 (3.4)	839 (14.9)
Blue collar	8,152 (47.8)	1,473 (8.7)	1,663 (9.9)	3,433 (25.3)
p-value**	.000	.015	.000	.000
Shift work				
No	5,494 (47.9)	920 (8.1)	806 (6.7)	2,459 (23.4)
Yes	4,620 (50.6)	855 (9.4)	949 (10.3)	1,546 (20.1)
p-value**	.000	.001	.000	.000
5-days work				
Yes	3,883 (50.7)	721 (9.5)	879 (10.8)	1,621 (23.6)
No	6,258 (46.5)	1,043 (7.7)	908 (7.0)	2,415 (23.4)
p-value**	.000	.000	.000	.724
Working hour(/week)				
40	741 (44.7)	121 (7.3)	138 (7.2)	331 (19.4)
> 40	6,988 (48.0)	1,167 (8.1)	1,108 (7.4)	2,896 (22.9)
p-value**	.010	.304	.835	.001
Experience of downsizing				
Yes	5,332 (49.5)	798 (7.5)	740 (7.0)	1,952 (22.2)
No	4,490 (47.1)	893 (9.5)	888 (9.2)	1,852 (23.5)
p-value**	.001	.000	.000	.047
Personality				
Type A	4,035 (48.7)	667 (8.1)	504 (6.3)	1,622 (23.8)
Type B	3,355 (42.0)	541 (6.8)	346 (4.5)	1,173 (18.4)
p-value**	.000	.002	.000	.000

* Statistical tests were calculated after excluding missing values

** All p-values were estimated by X² test

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Table 3. Distributions of medical utilization, occupational accident, and sickness absence by health-related behaviors

Dimension	Outpatient	Inpatient	Occupational accident	Sickness absence
N(%)*				
Smoking				
Current smoker	4,632 (45.7)	917 (9.2)	999 (9.6)	2,295 (26.5)
Non smoker	4,324 (51.9)	630 (7.6)	527 (6.1)	1,322 (18.6)
Ex-smoker	1,916 (52.5)	307 (8.5)	304 (8.0)	578 (18.1)
p-value**	.000	.001	.000	.000
Drinking				
Yes	8,334 (48.4)	1,404 (8.2)	1,427 (8.1)	3,280 (22.1)
No	2,633 (51.2)	472 (9.3)	430 (8.1)	943 (21.9)
p-value**	.000	.023	.952	.774
Exercise				
Yes	3,975 (50.4)	711 (9.1)	676 (8.2)	1,318 (19.3)
No	7,035 (48.4)	1,173 (8.1)	1,183 (7.9)	2,913 (23.6)
p-value**	.004	.019	.569	.000
Coffee intakes				
No	1,429 (55.0)	249 (9.7)	152 (5.8)	401 (16.3)
1~3	7,521 (48.4)	1,248 (8.1)	1,162 (7.4)	2,789 (21.5)
4	1,804 (47.4)	336 (8.9)	374 (9.7)	857 (26.7)
p-value**	.000	.013	.000	.000
Sleeping status				
good	5,028 (45.5)	848 (7.7)	633 (5.7)	1,625 (17.4)
poor	5,865 (52.6)	1,009 (9.1)	1,073 (9.5)	2,433 (26.2)
p-value**	.000	.000	.000	.000

* * Statistical tests were calculated after excluding missing values

** All p-values were estimated by X² test

(95% CI: 1.69~3.44) 가 가 0.84, 95% CI: 0.76~0.93 ,
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Table 4. Odds ratios and 95% confidence intervals* of medical utilization risk for quartile of self-perceived fatigue by occupational type

Fatigue level**	All			White Collar			Blue Collar		
	No.of cases	OR	95% CI	No.of cases	OR	95% CI	No.of cases	OR	95% CI
Outpatient									
Q ₁	2,298	1.00	-	616	1.00	-	1,682	1.00	-
Q ₂	2,036	1.19	1.05-1.35	672	1.12	0.89-1.41	1,364	1.23	1.06-1.43
Q ₃	2,121	1.45	1.28-1.65	785	1.50	1.20-1.87	1,336	1.42	1.22-1.66
Q ₄	1,812	1.95	1.70-2.24	679	2.16	1.69-2.75	1,133	1.83	1.55-2.17
p (trend) [†]		.000			.000			.000	
Inpatient									
Q ₁	2,292	1.00	-	615	1.00	-	1,677	1.00	-
Q ₂	2,030	1.02	0.81-1.30	674	0.81	0.51-1.29	1,356	1.12	0.86-1.48
Q ₃	2,115	1.14	0.90-1.44	791	1.01	0.66-1.57	1,324	1.18	0.89-1.56
Q ₄	1,810	1.38	1.08-1.77	675	1.36	0.87-2.11	1,135	1.34	0.99-1.82
p (trend) [†]		.024			.130			.089	

* Odds ratios and 95% confidence intervals were presented, based on logistic regression model adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

** Fatigue levels were presented using a quartile of MFS (Q₁: 0-73, Q₂: 74-82, Q₃: 83-95, Q₄: 96-)

[†] P (trend)s were calculated using the continuous scale of MFS, based on logistic regression model adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

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Table 5. Odds ratios and 95% confidence intervals* of occupational accident risk for quartile of self-perceived fatigue by occupational type

Fatigue level**	All			White Collar			Blue Collar		
	No.of cases	OR	95% CI	No.of cases	OR	95% CI	No.of cases	OR	95% CI
Q ₁	2,324	1.00	-	628	1.00	-	1,696	1.00	-
Q ₂	2,063	1.32	0.96-1.81	680	1.00	0.46-2.17	1,383	1.41	1.00-2.00
Q ₃	2,149	1.53	1.12-2.10	797	1.33	0.65-2.73	1,352	1.57	1.10-2.22
Q ₄	1,828	2.24	1.63-3.08	678	1.67	0.81-3.46	1,150	2.41	1.69-3.44
p (trend) [†]		.000			.047			.000	

* Odds ratios and 95% confidence intervals were presented, based on logistic regression model adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

** Fatigue levels were presented using a quartile of MFS (Q₁: 0-73, Q₂: 74-82, Q₃: 83-95, Q₄: 96-)

[†] P (trend)s were calculated using the continuous scale of MFS, based on logistic regression model, adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

Table 6. Odds ratios and 95% confidence intervals* of sickness absence risk for quartile of self-perceived fatigue by occupational type

Fatigue level**	All			White Collar			Blue Collar		
	No.of cases	OR	95% CI	No.of cases	OR	95% CI	No.of cases	OR	95% CI
Q ₁	2,090	1.00	-	572	1.00	-	1,518	1.00	-
Q ₂	1,849	1.24	1.04-1.47	614	1.28	0.91-1.80	1,235	1.21	0.99-1.48
Q ₃	1,959	1.53	1.29-1.82	742	1.42	1.03-1.97	1,217	1.59	1.30-1.94
Q ₄	1,694	1.84	1.53-2.20	639	1.65	1.18-2.30	1,055	1.95	1.57-2.42
p (trend) [†]		.000			.001			.000	

* Odds ratios and 95% confidence intervals were presented, based on logistic regression model adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

** Fatigue levels were presented using a quartile of MFS (Q₁: 0-73, Q₂: 74-82, Q₃: 83-95, Q₄: 96-)

[†] P (trend)s were calculated using the continuous scale of MFS, based on logistic regression model adjusted for gender, age, education, marital status, smoking, drinking, exercise, coffee intake, sleeping status, occupational type, shift work, 5-days work, working hour, experience of downsizing and personality

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