

Associations between working environment and weight control efforts among workers with obesity in Korea

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Abstract

Objective: The aim of this study was to investigate the relationship between working environment and weight control efforts among obese workers in Korea.

Methods: This study was based on the 2011 3rd Korean Working Conditions Survey, which was conducted on workers aged 15 years or older. A sample of 484 obese workers was included in the study. Multivariable logistic regression analysis was used to investigate the relationship between working environment and weight control efforts after controlling for individual variables. Adjusted odds ratios (ORs) and 95% confidence intervals were calculated.

Results: Of the participants, 63.4% reported that they made efforts to control their weight. After controlling for personal factors, the OR of weight control efforts for individuals working 40–49 hours per week was 2.4 times that for individuals working 60 hours or more per week. The OR of regular employment workers was 2.2 times that of non-regular workers.

Conclusion: We established that working hours and employment type were significantly related to weight control efforts. Therefore, we recommend that working conditions should be considered in designing effective workplace health promotion programs.

Keywords

Work environment, obesity, weight control efforts, employees, Korean Working Conditions Survey, workplace health

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Introduction

Recent increases in obesity worldwide are related to large environmental changes such as high-energy food consumption,

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predominantly sedentary living and constant stress.^{1,2} Obesity has substantial implications for personal health and socio-economic status, as it increases the risk of developing a wide range of serious diseases, including diabetes, hypertension, cancer, heart disease and stroke.³ Obesity also has serious financial implications through lost working days, increased benefit payments and social care costs.⁴ Living and working environments have a considerable influence on weight control efforts. The working environment is particularly important, as most adults spend a substantial amount of time at work, and workplaces may offer programs to improve employees' dietary and physical activity habits.⁵⁻⁸ Among the Organisation for Economic Cooperation and Development (OECD) countries, South Korea has a particular problem with long working hours.⁹ Thus, the workplace can be a practical location for health promotion;¹⁰ research indicates that workplace health promotion improves employees' productivity and health and has a modest effect on weight management.¹¹⁻¹³ In addition, effective weight management may lead to secondary improvements in the lifestyles of employees and their families outside the workplace.⁷

The relationship between working environment and obesity has been studied in relation to various measures. Physical working conditions are closely related to employee health status and sedentary occupations may lead to a higher incidence of obesity.¹⁴ Working hours affect the health behaviors of employees and their families.¹⁵ Workers exposed to long working hours or shift work, or who have multiple jobs, have little available time for family dinners and tend to consume calorie-dense fast foods and prepare convenience foods for their families, which leads to increased risk of obesity for workers and their families.¹⁶ Job stress and stress responses are associated with high body mass index, as stress

generated in low-control, high-demand work environments influences food choices and eating patterns.¹⁷ The workplace food environment affects the type of food that workers consume during breaks, and the nutritional quality of meals at work depends on the accessibility of healthy foods and workplace eating facilities.¹⁸

Although there are many studies on obesity and workplace environment in industrialized countries, little is known about the effect of working environment on weight management among Korean workers with obesity. The purpose of this study was to identify the relationship between working environment and weight control efforts among workers with obesity and to provide basic information to help improve the health and productivity of employees.

Methods

Study participants

This study was based on the 3rd Korean Working Conditions Survey (KWCS), conducted in 2011. The KWCS has been conducted since 2006 and it identifies current trends in working conditions, health and occupational hazards of Korean employees. The 3rd KWCS was conducted from 1 June to 30 November 2011. The survey included workers aged 15 years or older who had been paid for more than 1 hour of work during the previous week at the time of the survey. The survey data were collected from 50,032 workers. Of the participants, 973 workers had been diagnosed with obesity by doctors. Data from 484 workers who had a current diagnosis of obesity were included in the present analysis. Individuals who did not have a current diagnosis of obesity or had missing questionnaire data were not included in the study. This study complied with both domestic law on bioethics and safety and international guidelines, such as the Declaration of Helsinki, and

was exempted from approval by the Institutional Review Board of Sangmyung University because secondary data were used (SMUIRB-ex-2016-001).

Measurements

Participant obesity was measured using the question ‘Have you been diagnosed with obesity by a doctor?’ Weight control efforts were measured using the question ‘If you are currently obese, are you making any efforts to control your weight?’ The response choices for these questions were ‘yes’ or ‘no’. Participant characteristics assessed in the KWCS were as follows: gender (male or female); age (<30, 30–39, 40–49, 50–59 or ≥ 60 years); monthly income (<1 million KRW [approximately 900 USD], 1–1.99 million KRW [approximately 900–1,800 USD], 2–2.99 million KRW [approximately 1,800–2,700 USD] or ≥ 3 million KRW [approximately 2,700 USD]); level of education completed (middle school or below, high school, or college or above); smoking status (non-smoker or current smoker); frequency of alcohol consumption (none, \leq once per week or \geq twice per week); and self-rated health (good or bad). Self-rated health was evaluated by asking ‘What is your general health status?’ The responses ‘very good’ and ‘fair’ were categorized as ‘good’ and the responses ‘bad’ and ‘very bad’ were categorized as ‘bad’.

Work-related factors assessed in the KWCS were as follows: working hours per week (<40, 40–49, 50–59 or ≥ 60); workplace size by number of employees (<5, 5–49, 50–299 or ≥ 300); occupation type (professionals and technicians, service and sales workers, or manual laborers); working time flexibility (employer-centered or employee-centered); employment category (regular or non-regular). Working time flexibility refers to how working time is decided: it is employer-centered if the working

hours are determined by the company and cannot be changed or if employees are allowed to choose from the working hours already set by the company; it is employee-centered if employees can decide their working hours freely or with certain restrictions.

Statistical analysis

Data were analyzed using IBM SPSS Statistics, Version 22 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the individual and work-related participant characteristics. Chi-square tests were conducted to examine differences in weight control efforts by individual and working environment variables. Multivariable logistic regression analysis was used to investigate the relationships between working environment and weight control efforts after controlling for individual variables. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. A value of $p < .05$ was considered to be significant.

Results

Associations between individual/working environment characteristics and weight control efforts

Table 1 shows the associations between weight control efforts and individual characteristics of workers with obesity. A total of 63.4% of participants reported that they made efforts to control their weight. No significant association was found between individual characteristics and weight control efforts. The associations between weight control efforts and work-related characteristics are shown in Table 2. Of the work-related factors, occupation type and working time flexibility had no significant associations with weight control efforts, but workplace size ($p = .032$), working hours per week ($p = .001$) and

Table 1. Associations between individual characteristics and weight control efforts among obese workers.

Variables	Categories	Total (N = 484) n (%)	Weight control efforts		χ^2	p
			No (n = 177) n (%)	Yes (n = 307) n (%)		
Gender	male	318 (65.7)	117 (36.8)	201 (63.2)	0.020	.485
	female	166 (34.3)	60 (36.1)	106 (63.9)		
Age	<30	40 (8.3)	13 (32.5)	27 (67.5)	5.377	.251
	30–39	141 (29.1)	59 (41.8)	82 (58.2)		
	40–49	159 (32.9)	56 (35.2)	103 (64.8)		
	50–59	104 (21.5)	31 (29.8)	73 (70.2)		
	≥60	40 (8.3)	18 (45.0)	22 (55.0)		
Education	≤ middle school	61 (12.6)	27 (44.3)	34 (55.7)	5.366	.068
	high school	202 (41.7)	81 (40.1)	121 (59.9)		
	≥ college	221 (45.7)	69 (31.2)	152 (68.8)		
Monthly income (million KRW)	<1	50 (10.3)	22 (44.0)	28 (56.0)	7.549	.056
	1–1.99	164 (33.9)	68 (41.5)	96 (58.5)		
	2–2.99	139 (28.7)	51 (36.7)	88 (63.3)		
	≥3	131 (27.1)	36 (27.5)	95 (72.5)		
Smoking	non-smoker	335 (69.2)	120 (35.8)	215 (64.2)	0.263	.339
	smoker	149 (30.8)	57 (38.3)	92 (61.7)		
Alcohol consumption (frequency)	none	101 (20.9)	38 (37.6)	63 (62.4)	1.285	.526
	≤ once per week	256 (52.9)	88 (34.4)	168 (65.6)		
	≥ twice per week	127 (26.2)	51 (40.2)	76 (59.8)		
Self-rated health	not good	214 (44.2)	84 (39.3)	130 (60.7)	1.190	.160
	good	270 (55.8)	93 (34.4)	177 (65.6)		

employment category ($p = .002$) showed statistically significant associations with weight control efforts. Regarding efforts to control weight based on workplace size, 52.0% of workers in workplaces with less than 5 employees, 68.4% of those in companies with 5–49 employees, 57.8% of those in companies with 50–299 employees and 68.3% of workers in companies with 300 employees or more reported that they were trying to control their weight. Regarding working hours per week, 60.0% of individuals working under 40 hours, 70.9% of those working 40–49 hours, 63.7% of those working 50–59 hours and 47.7% of those working 60 hours or more (a relatively low percentage) reported that they were trying to control their weight. Finally, regarding employment category,

66.3% of regular workers and 47.2% of non-regular workers reported trying to control their weight, which shows that regular workers were more likely to engage in weight control efforts.

Working environment factors affecting weight control efforts

Multivariable logistic regression analysis was performed after controlling for personal factors, such as gender, age, monthly income, education level, smoking, drinking and subjective health status, to examine the working environment factors that positively influenced weight control efforts. The results showed that working hours per week ($p = .008$) and employment category ($p = .015$) significantly influenced weight

Table 2. Associations between working environment and weight control efforts among obese workers.

Variables	Categories	Weight control efforts						χ^2	p
		Total (N = 484) n (%)	No (n = 177) n (%)		Yes (n = 307) n (%)				
Occupation type	professionals & technicians	263 (54.3)	93 (35.4)	170 (64.6)					
	service & sales manual	117 (24.2)	45 (38.5)	72 (61.5)					
Workplace size (no. of employees)	<5	104 (21.5)	39 (37.5)	65 (62.5)					
	5–49	75 (15.5)	36 (48.0)	39 (52.0)	8.824	.032			
	50–299	237 (49.0)	75 (31.6)	162 (68.4)					
	≥300	109 (22.5)	46 (42.2)	63 (57.8)					
Working hours per week	<40	63 (13.0)	20 (31.7)	43 (68.3)					
Working hours per week	<40	40 (8.3)	16 (40.0)	24 (60.0)	17.696	.001			
	40–49	244 (50.4)	71 (29.1)	173 (70.9)					
	50–59	91 (18.8)	33 (36.3)	58 (63.7)					
	≥60	109 (22.5)	57 (52.3)	52 (47.7)					
Working time flexibility	decided by company	382 (78.9)	137 (35.9)	245 (64.1)	3.609	.307			
	can select from company-made schedule	58 (12.0)	26 (44.8)	32 (55.2)					
	partially decided by employee	36 (7.4)	10 (27.8)	26 (72.2)					
	completely decided by employee	8 (1.7)	4 (50.0)	4 (50.0)					
Employment category	regular	412 (85.1)	139 (33.7)	273 (66.3)	9.578	.002			
	non-regular	72 (14.9)	38 (52.8)	34 (47.2)					

control efforts (Table 3). The OR of weight control efforts was 2.4 (95% CI 1.455–3.976) for individuals working 40–49 hours compared with those working 60 hours or more, and 2.2 (95% CI 1.166–4.170) for regular workers compared with non-regular workers.

Discussion

This study showed that 63.4% of workers with obesity tried to control their weight. Among the working environment variables, chi-square analyses showed that there were significant differences between the weight control effort group and the non-effort group in company size, working hours per week and employment type. The analysis of the working environment factors associated

with weight control efforts showed that, after controlling for individual factors, working hours and employment category significantly influenced weight control efforts.

Workers with obesity were less likely to make efforts to control weight when they worked longer hours. Overweight or obese workers who work overtime have limited time to participate in behavior change interventions for obesity management in the workplace, which makes it more difficult for them to control their weight.^{19,20} Long working hours reduce physical activity time and are an obstacle to weight loss for overweight or obese workers.²¹ The effects of working hours involve the health behaviors of both employees and their families.¹⁵ Long working hours can lead to reduced dinner times with family members and

Table 3. Associations between working environment and weight control efforts among obese workers: regression analysis results.

Variables	Categories	OR	95% CI		p
			lower	upper	
Gender	male	1.000			
	female	1.267	0.738	2.177	.390
Age	<30	1.408	0.487	4.072	.527
	30–39	0.657	0.268	1.607	.357
	40–49	0.938	0.396	2.219	.884
	50–59	1.373	0.584	3.231	.467
	≥60	1.000			.151
Education	≤ middle school	0.558	0.236	1.319	.184
	high school	0.663	0.405	1.086	.103
	≥ college	1.000			.219
Monthly income (million KRW)	<1	0.537	0.200	1.447	.219
	1–1.99	0.593	0.313	1.124	.109
	2–2.99	0.726	0.405	1.301	.282
	≥3	1.000			.436
Smoking	non-smoker	1.125	0.708	1.787	.618
	smoker	1.000			
Alcohol consumption (frequency)	none	1.209	0.621	2.354	.577
	≤ once per week	1.305	0.787	2.166	.302
	≥ twice per week	1.000			.586
Self-rated health	not good	0.911	0.604	1.373	.655
	good	1.000			
Occupation type	professionals & technicians	0.688	0.367	1.290	.244
	service & sales	0.916	0.478	1.756	.791
	manual	1.000			.447
Workplace size (no. of employees)	<5	0.691	0.301	1.585	.383
	5–49	1.183	0.607	2.305	.621
	50–299	0.647	0.322	1.299	.221
	≥300	1.000			.070
Working hours per week	<40	2.057	0.846	5.001	.111
	40–49	2.405	1.455	3.976	.001
	50–59	1.679	0.920	3.064	.091
	≥60	1.000			.008
Working time flexibility	decided by company	2.047	0.445	9.412	.357
	can select from company-made schedule	1.623	0.323	8.147	.556
	partially decided by employee	3.520	0.649	19.091	.145
	completely decided by employee	1.000			.346
Employment category	regular	2.205	1.166	4.170	.015
	non-regular	1.000			

OR: odds ratio; CI: confidence interval.

 $\chi^2 = 16.267$, $p = .039$; Hosmer–Lemeshow goodness-of-fit test.

increased intake of calorie-dense fast food and convenience foods, which can increase weight gain and hinder weight control in workers with obesity.¹⁶ Among OECD countries, South Korea has the third longest working hours;²² therefore, time constraints on weight control efforts have a substantial impact on obesity management among Korean workers.

Employment category (regular vs. non-regular) affects workers' health status.²³⁻²⁵ Most non-regular jobs are characterized by poor working conditions, and long working hours and overtime work are associated with deteriorations in subjective health status and sociopsychological health.²⁶ Except for on-call work, non-regular work is more insecure and associated more with poorer health than regular work.²⁴ Previous research indicates that unstable employment patterns are likely to be linked to poor working conditions and long working hours, and these factors are associated with mental health deterioration, including decreased job satisfaction, deterioration of subjective health status and depression. These health factors are also associated with weight gain and weight management.²⁷ Therefore, the results of the present study suggest that employment pattern is one of the variables that influences weight control efforts among workers with obesity. Precarious employment is consistently and positively associated with job dissatisfaction.²⁸ Precarious workers in Scandinavian welfare states report better or equal health status compared with their permanent worker counterparts. In contrast, precarious work in other welfare state regimes is associated with adverse health outcomes.²⁵ The effect of employment category on worker health status depends on the welfare state of each country. According to a systematic review of the literature on health among regular workers and those with precarious employment, precarious workers' unstable employment and limited income may affect their health in

several ways.²⁹ In recent years, unstable employment patterns and global recession have increased. The number of workers exposed to job instability is expected to rise further; therefore, employment patterns should be considered in future health care management, and support is needed for additional research to confirm the effects of employment category on health.

Company size was not statistically significant in the multivariable analysis of weight control efforts in workers with obesity. However, some previous studies have suggested that larger workplaces are more likely than smaller ones to operate healthy diet programs or strategies to increase physical activity; thus, workplace size can be a major contributor to the effective management of obesity. Mid- and large-sized companies may be able to offer employees food and physical activity options onsite, and should consider implementing worksite wellness guidelines or policies, such as nutrition guidelines for their food service facilities. Companies could widen the range of foods and beverages they offer through healthy choices and differential pricing, and should consider offering wellness programs that promote healthy eating and active living, and providing incentives for weight-management programs.³⁰ It is important that larger employers who offer a canteen or vending options within the workplace increase their focus on improving the nutritional quality of the food prepared, served and purchased.³¹ Nevertheless, although workplace size was related to the weight control efforts of workers with obesity in this study, this association was not statistically significant after controlling for individual factors. One possible reason for this is that it was difficult to exclude the effect of interactions between the variables included in the multivariable analysis. Another possible reason relates to a study limitation: secondary data were used, which did not include information on obesity management

programs provided in the workplace; thus, it is difficult to interpret this result.

The recognition of obesity by both employers and workers is crucial for the effectiveness of industrial obesity management. Heinen (2009) reported that employers need to establish their own policies and practices to support weight management, and could exercise leadership and communication in a variety of ways to facilitate a culture of health at work.³² Teixeira (2012) has suggested that if employees fully endorse weight-loss-related behavioral goals and feel not only competent but also autonomous in reaching them, their efforts are more likely to result in long-lasting behavior change.³³ The workplace is often considered a barrier to healthy eating and physical activity; however, many workers support the concept of workplace health promotion and have offered suggestions for overcoming many of the identified barriers.^{30,32,33} As demonstrated in this study, workplaces can be effective in engaging populations at risk of obesity and related illnesses, although it may be necessary to go beyond traditional workplace wellness approaches. The use of more innovative methods may increase the reach, effectiveness and sustainability of such programs.³⁴ It is essential to recognize the importance of obesity management and to develop effective intervention strategies by recognizing the mid- and long-term effects of obesity, such as the deterioration of health status. This was a cross-sectional study and could not demonstrate causality between work-related environmental factors and weight control efforts among workers with obesity; thus, further research that includes longitudinal studies is needed to identify causal relationships.

Conclusion

We examined the relationship between working environment and weight control

efforts among workers with obesity and found that working hours and employment category were significantly associated with weight control efforts. These results provide basic information to help improve the health and productivity of employees, and highlight the importance of considering occupational characteristics in designing effective workplace health promotion programs that target physical activity and obesity among workers.

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Declaration of conflicting interests

The authors declare that there is no conflict of interest.

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