

Some Environmental Factors Associated with Obesity in Women Attending A Physical Fitness Program in the Ulsan Area

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ABSTRACT

A sample of 450 women who attended a physical fitness program in the Ulsan area was selected to study some environmental factors associated with obesity. The women were grouped into two categories, obese and nonobese, based on body mass index(Kg/m²). Average BMI of the total subjects was 24.3 ± 4.8 , but 34.7% of the subjects rated equal to or more than 25, which can be considered as obese. The results showed that age, employment status, family type, and food frequency score have a statistically significant association with obesity. However education level, nutrition knowledge, availability of housemaids, family history of obesity, and house type are not related to obesity. There were no differences in source of nutrition information between the obese and the nonobese. The above results suggest that health education programs should consider environmental factors as well as health factors in preventing obesity in the community. (*Korean J Nutrition* 30(9) : 1084~1087, 1997)

KEY WORDS : environmental factors · obesity · women · physical fitness · food frequency · nutrition knowledge.

Introduction

Obesity has become one of the major public health problems in Korea¹⁻⁴. It is highly accepted that reduction in physical activity and high intake of foods rich in fats and sugar play important roles in the occurrence of obesity⁵.

Obesity is a common and chronic condition associated with an increased risk of many major diseases such as diabetes mellitus, hypertension, dyslipidemia, cardiovascular disease, cancer, gallbladder disease and osteoarthritis⁶. The individual burden of obesity includes the reduction of quality of life, increased morbidity, and premature mortality⁷.

This study was to evaluate the prevalence of obesity among women and to investigate some environ-

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mental factors associated with obesity.

Subjects and Methods

The subjects were 450 women attending a physical fitness program in Ulsan area. Body weight and height measurements and interviewing were carried out in the survey. A questionnaire, that was pre-tested with 20 women included questions on the socioeconomic backgrounds of the women, sources of their nutrition information, their food habits, and nutrition knowledge.

Weight and height were measured and body mass index(Kg/m²) was calculated. A body mass index (BMI) score equal to or more than 25 was categorized as obese, while a BMI score of less than 25 was nonobese⁸. It is known that BMI has a relatively high correlation with body fat, and a low correlation

with height⁹.

Food frequency data usually gives a better estimation of typical nutrient consumption. Food frequency score was based on frequency intake of high calorie foods as snacks. For the questionnaires 10 food items were chosen to investigate the trend of consumption of food. Each item was assigned 1-3 points according to frequency, and the total maximum score was 30 points. To obtain data on nutrition knowledge of subjects, a nutrition knowledge test score was used. A list of 10 nutrition fact categories were separated into information about basic nutrition, information about dietary fats, and information about food and nutrients. Correct answers were given 3 points for each item, and the total maximum score was 30 points.

Data was analyzed using spss-ps+ package. Chi-square was used to evaluate the statistical significance of differences in socioeconomic background and dietary habits, between obese and nonobese groups and t-test was used in food frequency test and nutrition knowledge test.

Results and Discussion

The incidence of obesity in the subjects is relatively high(34.7%). This may be due to the fact that obese women attend more physical exercise programs than nonobese women.

1. Demographic background

Table 1 showed general demographic characteristics of subjects. The majority of women were middle aged(80.2%), high school educated(46.9%), unemployed(74.0%), and lived in a nuclear family(78.2%).

The prevalence of obesity is affected by several socioeconomic and cultural factors¹⁰. There were significant differences in age, employment status, and family type between the obese and the nonobese women. However, education level, availability of housemaid, family history of obesity, and house type of subjects were not different between the obese and the nonobese groups(Table 2).

Older women(> 40 years old) have a higher risk of obesity than younger women. Noppa and Bengtsson

Table 1. Demographic characteristics of the subjects

Characteristic	Number	Percent
Age(year)		
<30	49	10.9
30-39	183	40.7
40-49	178	39.5
≥50	40	8.9
Education level		
Middle school	141	31.3
High school	211	46.9
College	98	21.8
Employment		
Unemployed	333	74.0
Employed	117	26.0
Family size		
<5	352	78.2
≥5	98	21.8
Total	450	100.0

Table 2. Environmental factors associated with obesity among women studied

	Nonobese		Obese		χ^2
	N	%	N	%	
Age(year)					
<30	38	12.9	11	7.1	18.42**
30-39	124	42.2	59	37.8	df=3
40-49	107	36.4	71	45.5	
≥50	25	8.5	15	9.6	
Education level					
Middle school	68	23.1	73	46.8	3.61
High school	174	59.2	37	23.7	df=2
College	52	17.7	46	29.5	
Employment					
Unemployed	215	73.1	118	75.6	4.61*
Employed	79	26.9	30	24.4	df=1
Family size					
<5	224	76.2	128	82.1	3.96*
≥5	70	23.8	28	17.9	df=1
Housemaid					
Available	58	19.7	30	19.2	2.70
Not available	236	80.3	126	80.8	df=1
Have a car					
Yes	115	39.1	59	37.8	1.62
No	179	60.9	97	62.2	df=1
Family history of obesity					
Yes	94	32.0	54	34.6	2.94
No	200	68.0	102	65.4	df=1
House type					
Unit house	99	33.7	58	37.2	1.87
Apartment	195	66.3	98	62.8	df=1

*p<0.05 **p<0.01

¹¹⁾ reported similar findings, stating that as the age of women increased, the prevalence of obesity increased. The phenomenon was also observed by other investigators in Finland¹²⁾. They found that the prevalence of obesity was the highest among older women (65–74 years) and the lowest among young women (25–34 years).

Several studies have shown that women who belong to a low socio-economic status run the highest risk of obesity than women who belong to other social classes¹¹⁾¹³⁾. Employed women have less risk of obesity than unemployed women. This may be due to the fact that employed women are more exposed to society and therefore more interested in maintaining their weights and taking care of their figures. The difference was statistically significant ($p < 0.05$) in family type between obese and nonobese women. Women of nuclear family type have higher risk of obesity than women of extended family type.

Although it is commonly assumed that obese women are more dependent on cars or housemaids than nonobese women, the findings of this study showed the contrary; women who had cars or hired housemaids in home management were less likely to be obese than women who did not have cars or did not hire housemaids. The reason for this unexpected result is believed that the former group may have a job and more engaged in social activities than latter.

Heredity was reported as an important factor in the development of obesity¹⁴⁻¹⁶⁾. In this study the prevalence of women with one or more obese close relatives was 36.5 percent, compared to 33.8 percent among women who have no obese relatives.

2. Meal patterns

The prevalence of obesity of women who skip breakfast was statistically ($p < 0.05$) higher than women who do not skip breakfast. The difference was statistically significant ($p < 0.05$) between obese and nonobese in eating evening snacks or not, while there was no significant difference in eating morning snacks between obese and nonobese women (Table 3).

The mean score of food frequency was 15.7 ± 4.3 (ranging from 11 to 23). Food frequency score was significantly ($p < 0.05$) higher among obese women than nonobese women. There were significant dif-

Table 3. Meal patterns among obese and nonobese women

	Nonobese		Obese		χ^2
	N	%	N	%	
Skipping breakfast					
Yes	76	25.9	60	38.5	5.96*
No	218	74.1	96	61.5	df=1
Eating morning snack					
Yes	118	40.1	58	37.2	2.45
No	176	59.9	98	62.8	df=1
Eating evening snack					
Yes	113	38.4	76	48.7	4.72*
No	181	61.6	80	51.3	df=1

* $p < 0.05$

Table 4. Mean values of food frequency score of subjects

Food	Nonobese	Obese
	(n=294)	(n=156)
	← mean \pm standard deviation →	
Ice cream	1.2 \pm 0.7	1.4 \pm 0.4
Cakes	1.4 \pm 0.6	2.1 \pm 0.5**
Chocolates & sweets	1.3 \pm 0.9	1.3 \pm 1.2
Meat sandwich	1.2 \pm 1.4	1.4 \pm 1.1
Potato chips	1.5 \pm 0.8	1.7 \pm 0.7*
Fried vegetables or fish	1.4 \pm 1.0	2.3 \pm 1.3**
Ramyon	2.3 \pm 0.9	2.4 \pm 0.7
Pizza	1.9 \pm 1.2	2.0 \pm 0.9
Soft drinks	1.8 \pm 0.7	2.1 \pm 0.4
Alcoholic beverages	1.2 \pm 0.9	1.3 \pm 1.1

* $p < 0.05$ ** $p < 0.01$

Table 5. Percentage of correct answers for nutrition knowledge score

Content	Numbers of item	Percentage of correct answers		
		Nonobese (n=294)	Obese (n=156)	Total (n=450)
Basic nutrition	3	60.2	57.5	58.8
Dietary fats	2	76.5	78.9	77.7
Food and nutrient	5	65.1	66.2	65.7

ferences between the two groups in the consumption of cakes ($p < 0.01$), potato chips ($p < 0.05$), and fried vegetables or fish ($p < 0.01$) for snacks. It means the obese women more frequently consumed high calorie foods than the nonobese (Table 4). The mean score of nutrition knowledge was 18.7 ± 3.5 (ranging from 15 to 24). The percentage of correct answers in assessing nutrition knowledge are presented in Table 5. There was no significant difference in nutrition knowledge scores between two groups (Table 6).

Table 6. Mean scores of food frequency and nutrition knowledge

	Nonobese (n=294)		Obese (n=156)	
	mean ± standard deviation			
Food frequency score	14.1 ± 3.1		18.9 ± 5.2*	
Nutrition knowledge score	18.6 ± 3.4		19.1 ± 3.7	

*p<0.05

Table 7. Sources of nutrition information among women studied

Source	Nonobese		Obese		Total	
	N	%	N	%	N	%
Books	83	28.2	34	21.8	117	26.0
Megazines	86	29.2	39	25.0	125	27.8
Television	74	25.2	32	20.5	106	23.5
Professionals	12	4.1	20	12.8*	32	7.1
Relatives & friends	25	8.5	14	9.0	39	8.7
Others	14	4.8	17	10.9	31	6.9
Total	294	100.0	156	100.0	450	100.0

*p<0.05

3. Sources of nutrition information

Books and magazines were the main sources of nutrition information for both obese and nonobese women (Table 6). There were no significant differences in nutrition information sources between the obese and the nonobese woman. There was, however, a significant difference in getting nutrition information from health professionals between two groups. Most commercial books and magazines available to women in this area contain a lot of faulty advice regarding losing weight. A lack of education about good nutrition may be their main problem. Efforts to provide sound nutrition knowledge and to correct unsound beliefs and attitudes towards obesity should be given a high priority in nutrition and health education programs carried out by the health authorities in the country.

We concluded that several social factors may contribute to occurrence of obesity among women in the Ulsan area. This confirms the fact that nutritional disorders are caused by many factors and not only by health factors. The need of a multisectorial program is essential in controlling obesity and its complications. Health activities should pay more attention to the diseases of affluence such as obesity, diabetes mellitus, and heart diseases.

Literature cited

- 1) Moon HN, Hong SJ, Suh, SJ. The prevalence of obesity in children and adolescents. *Korean J Nutrition* 25(5) : 413-418, 1992
- 2) Kim HS, Lee LH. The prevalence of obesity and its related factors of high school girls in the large cities. *Korean J Nutrition* 26(2) : 182-188, 1993
- 3) Moon SJ, Kim HS, Kim JH, Park GS, You YH. The effect of weight control on obese women. *Korean J Nutrition* 28(8) : 759-770, 1995
- 4) Lee LH. Effects of dietary patterns on health and disease status in Korean. *Korean J Dietary Culture* 8(4) : 359-372, 1993
- 5) Musaiger AO. Nutritional Disorders associated with Affluence in Bahrain. *Family Practice* 7(9) : 9-13, 1990
- 6) Xavier P, Sunyer F. Health implication of obesity. *Am J Clin Nutr* 52(6) : 1595s-1603s, 1991
- 7) Neggers YH, Stitt KR, Roseman JM. Obesity : Problems with Definition and Prevalence. *The J of Obesity and Weight Regulation* 8(2) : 119-134, 1989
- 8) Seidell JC, Deurenberg P and Hautvast JG. Obesity and Fat Distribution in Relation to Health Current Insights and Recommendations. *World Review of Nutrition on Diet* 50 : 57-91, 1987
- 9) Garrow JS, Webster Y. Quetlet index(W/H²) as a measure of fatness. *Int J Obesity* 9 : 147-153, 1985
- 10) Deurenberg P and Hautvast GAJ. Prevalence of overweight and obesity in the Netherlands in relation to socio-demographic variables, lifestyle and eating behavior : starting points for the prevention and treatment of obesity. *Bibl Nutr Dieta* 44 : 8-21, 1989
- 11) Noppa H and Bengtsson C. Obesity in relation to socio-economic status. *J of Epidemiology and Community Health* 34 : 139-142, 1990
- 12) Heliorara M and Aroma A. Parity and Obesity. *J of Epidemiology and Community Health* 35 : 1979-1999, 1991
- 13) Hazuda HP, Haffneer SM, Stern MP and Elieler CW. Effect of Acculturation and Socio-economic status on obesity and diabetes in Mexican Americans. *Am J of Epidemiology* 128(8) : 1289-1301, 1988
- 14) Stumkard AJ, Harris JR, Pedersen NL and McClearn GE. The body mass index of twins who have been reared apart. *N Engl J Med* 322 : 1483-1487, 1990
- 15) Mac Donald and Stumkard AJ. Body mass indexes of British separated twins(letter). *N Engl J Med* 322 : 1530, 1990
- 16) Price RA and Gottesman II. Body fat in identical twins reared apart : roles for genes and environment. *Behav Genet* 21 : 1-7, 1991