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Concerns about Teenage Obesity and Diet Behaviors : Middle and High School Students in Ulsan

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ABSTRACT

This study is to investigate the concerns about obesity and diet behaviors among 565 middle and high school students in Ulsan. The results indicated that high school students rather than middle school students and girls rather than boys had higher concerns about obesity and diet behaviors. For the socio-economic variables, being female, a high school student, and a group with the least monthly allowance was higher concern about obesity and diet; and household income, educational level and occupation of the fathers also had significant impacts on the student concerns about obesity and diet behaviors. The variables of height, weight, PIBW (Percentage of Ideal Body Weight), and BMI (Body Mass Index) had significant impacts on the concerns about obesity and diet behaviors. Especially, students with normal weight had the highest concerns about obesity and diet, while obese students had the lowest concerns. (*J Community Nutrition* 7(4) : 184~192, 2005)

KEY WORDS : concerns about obesity · diet behaviors · teenagers · socio-economic variables.

Introduction

In the past few decades, the Korean lifestyle, dietary habits, and food intake has undergone significant changes with the rapid economic growth. Now the problem of obesity has become a hot issue in Korea. According to the recent report on "prevalence and complication of obesity among teenagers (Chosun Ilbo, July 20, 2004)", which was conducted for the 3,615 middle students in 14 cities, including Seoul, and five major cities in Korea, 17 percent of all teenagers proved to be obese and the rates of obesity were 22.3% for boys and 10.7% for girls. Among obese teenagers, 76.5 percent had one disease related to obesity such as high blood sugar, hyperlipidemia, or high blood pressure, while 36.3 percent had two or more diseases. Compared to teenagers with normal weight, it is reported that the probability of obese teenagers having a specific disease was 13 times higher. Considering the fact that 80 percent of obese teenagers is related to persistence of obesity into adulthood, now obesity seriously risks the health of teenagers in Korea. Therefore, we have to recognize that the problem of obesity is not limited to adults, but has enlarged to include children and teenagers (Cheong et al. 1997).

Since much research has shown that obesity is closely related to risk factors of multiple adult diseases (Klesges et al 1995 ; Ko 1993 ; Lee 1992 ; Lee et al. 1995 ; Na et al. 2003 ; William et al. 1996), it has increased people's recognition on weight control and many people experience dieting in Korea (Lee et al. 2000 ; Rim et al. 1998 ; Ryu, Yoon 2000). According to the "1998 National Health and Nutrition Survey" conducted by the Korea Institute for Health and Welfare (1999), 33.1 percent among teenagers answered that they had attempted to lose weight and the main reasons were 'balanced appearance' (52.8%) and 'to improve physical strength' (20.5%). Thus, we can understand that teenagers' concerns on weight loss are very high.

On the other hand, form the influence of mass media, it is popular to have a strong desire for thinness in Korean society (Cheong, Chang 2003 ; Ryu, Yoon 2000). Some research, however, protests the risk of inappropriate diet behaviors. The studies on diet behaviors in female college students

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(Kim 1998 ; Kim et al. 1997) warned that the risks of health of students by inappropriate diet behaviors, such as a fast for weight control and mere imitations of popular diet methods. Due to the misunderstanding on weight control, it was reported that some women, who are a normal weight or even under weight, attempt to diet (An et al. 1996 ; Lee, Lee 1996 ; Park, Yoo 1998). In the study of Park et al. (1997), among female college students, 53.8 percent with under weight and 60.5 percent with normal weight answered that they do weight control. Kim et al. (1998) also reported that 48.2 percent among female college students attempted unnecessary dieting. Ryu, Yoon (1998) studied female high school students and found that 56.2 percent of the sample experienced weight control. For the study of the sample of elementary, middle, and high school students in Seoul, Jang et al. (2002) reported that 25.7 percent of the elementary school, 30.9 percent of the middle school, and 45.7 percent of the high school students attempted weight control. These studies usually focused on diet experience, but did not properly identify the related factors to the diet behaviors. Not only some factors such as age and gender as presented by the previous studies, but also other socio-economic variables (for example, household income, education level of the father, occupation of the father, or the job status of the mother) are expected to influence the diet behaviors among students.

The purpose of this study is to investigate the concerns about obesity and diet behaviors, to identify differences in the concerns about obesity and diet behaviors by socio-economic and physical fitness variables, and to analyze the relationship between concerns about obesity and diet behaviors. For this study, the data was sampled from 565 middle and high school students in Ulsan. The results of this study provide information that is useful for the development of a school program that helps the teenager to grow healthily.

Subjects and Methods

1. Data

The sample for this study was about 600 middle and high school students in Ulsan. This survey was carried out during one month in May 2003. Considering the characteristics of school, life environment, and gender, six middle schools and six high schools in Ulsan were selected, and by convenience sampling one class in the second grade at each selected school was chosen. Finally, 556 samples were used for the analyses.

2. Measurement of variables

For this study a questionnaire was used and it included questions such as concerns about obesity and diet behaviors, body sizes, and socio economic characteristics. The specific questions about obesity and diet behaviors were based on the previous studies such as Kim et al. (1999), Kim SH (2003), and Lee et al. (2001). The reliability of concerns about obesity and diet behaviors was measured by the Cronbach' internal consistency and it was proven that these measures had an appropriate reliability (Cronbach' alpha of concerns about obesity and diet behavior was 0.707 and 0.709, respectively) And five major professors re-approved the content for validity.

1) Concern about obesity

The concerns about student obesity were measured through three questions which are indicated in Table 5. All three questions were measured on a Likert scale such as from 1 'Strongly Disagree' to 5 'Strongly Agree'.

2) Concern about diet behaviors

As shown in Table 6, the student concerns about diet behaviors were measured by the three questions. Using a Likert scale, the three questions have from 1 'Strongly Disagree' to 5 'Strongly Agree'.

3) Body size

The weight and the height of the students used were the figures from a regular physical examination in 2003. BMI (Body Mass Index) was calculated from weight (kg)/height $(m)^2$. PIBW (Percent Ideal Body Weight) was the percentage of weight to abnormal weight and abnormal weight was calculated by Broca method, {Height (cm) − 100} × 0.9.

3. Data analysis

We have used the SPSS PC+ program to analyze the statistics. For the general description of the socio-economic characteristics, weight, height, and BMI of the samples, the frequencies and percentages were used. The means and standard deviations were also used to analyze the concerns about obesity and diet behaviors in the samples. The ANOVA and Scheffe test were applied to analyze if there are differences in the student concerns about obesity and diet behaviors to the variables of the socio-economic characteristics and of body size such as height, weight, PIBW, and BMI. Pearson's correlation was used to analyze the relationships between concerns about obesity and diet behaviors.

Results and Discussion

1. General characteristics of the sample

1) Socio-economic characteristics

Table 1 shows the socio-economic characteristics of the sample. For the sample, girls comprised 58.1% of the total and boys 41.9%, and high school students comprised 56% and middle school students 44%. For the monthly allowance of the sample, the category of less than 50,000 won was 56% and the category of more than 100,000 won was 23%. Thus, we assume that compared to the past, it is easy for teenagers to show greater interest in body image and appearance because they now have rich economic resources. For the education levels of the fathers, 54.3 percent were high school graduates, 40.4 percent had some college or more, and 5.4 percent less than high school. For the education levels of the mothers, 62 percent were high school graduates and 27.2 percent had some college or more. For the occupations of the fathers, professional comprised 31.3 percent of the sample, office worker 29.3 percent, production 24 percent, and sales and service 13.2 percent, respectively. For the job status of the mothers, the rate of employed mothers (46.4%) was lower than that of non-employed mothers (53.6%). For the monthly household incomes, 38.2 percent were less than 2,000,000 won and 26.6 percent more than 3,000,000 won.

Table 1. Socio-economic characteristics of the sample

	Variables	N(%)		Variables	N(%)
Gender	Boys	236(41.9)	School	Middle	245(44.0)
	Girls	327(58.1)		High	312(56.0)
	Total	563(100.0)		Total	557(100.0)
Education level of mother	Less than high school	58(10.8)	Education level of father	Less than high school	29(5.4)
	High school graduate	332(61.9)		High school graduate	291(54.3)
	Some college or over	146(27.2)		Some college or over	216(40.3)
	Total	536(100.0)		Total	563(100.0)
Monthly allowance	Below 50,000	311(55.9)	Monthly household income	Below 2,000,000	198(38.2)
	50,000 – 100,000	116(20.9)		2,000,000 – 3,000,000	182(35.1)
	Over 100,000	129(23.2)		Over 3,000,000	138(26.6)
	Total	556(100.0)		Total	518(100.0)
Occupation of father	None	11(2.1)	Job status of mother	Non-employed	303(53.6)
	Professional	168(31.3)			
	Office worker	157(29.3)			
	Sales & service	71(13.2)		Employed	262(46.4)
	Production & other	129(24.1)			
	Total	536(100.0)		Total	565(100.0)

Reference : In the deal of the missing values, the default of SPSS program is the listwise, but it has the problem that can reduce rapidly the sample size because it deletes all of the case with missing values. In this study, we used the pairwise method that deletes only the case with a missing value in one variable, so the value of N is not the same at each variable (Lee 2001)

Table 2. Height and weight of the sample

		Middle school			High school		
		Boys	Girls	Total	Boys	Girls	Total
		N(%)	N(%)	N(%)	N(%)	N(%)	N(%)
Height	> 168 cm	29(29.0)	4(3.0)	33(14.2)	109(88.6)	16(8.7)	125(40.8)
	160 – 168 cm	38(38.0)	25(18.9)	63(27.2)	13(10.6)	117(63.9)	130(42.5)
	< 160 cm	33(33.0)	103(78.0)	136(58.6)	1(0.8)	50(27.3)	51(16.7)
	Total	10(100.0)	132(100.0)	232(100.0)	123(100.0)	183(100.0)	306(100.0)
Weight	> 58 kg	29(29.3)	16(12.2)	45(19.6)	100(83.3)	19(10.9)	119(40.5)
	48 – 58 kg	38(38.4)	44(33.3)	82(35.7)	20(16.7)	90(51.7)	110(37.4)
	< 48 kg	32(32.3)	71(54.2)	104(44.8)	-	65(37.4)	65(22.1)
	Total	99(100.0)	131(100.0)	230(100.0)	120(100.0)	174(100.0)	294(100.0)

2) Body size

Table 2 shows the general height and weight of the sample. For the middle school students, 38 percent of the boys were the category of 160 − 168cm, while 78 percent of the girls were the category of less than 160cm. For the mean weight of middle school students, 38 percent of the boys were the category of 48 − 58kg, while 54 percent of the girls were the category of less than 48kg.

For the high school students, 89 percent of the boys were the category of over than 168cm, while only 64 percent of the girls were the category of the 160 − 168cm. For the mean height, 83 percent of the boys were the category of the over than 58kg, and 52 percent of the girls were the category of the 48 − 58kg.

The PIBW of the sample is shown in Table 3. Among the middle students of the sample, 56.7 percent were categorized into under weight and only 28.6 percent normal weight. Among the high school students, 45.2 percent were categorized into over weight and 41.7 percent normal weight. For boys and girls, boys were likely to have a overweight (approximately 64%), while the weight of almost girls were normal (46%) and underweight (44%).

Table 4 shows the general BMI of the sample. The rate of normal weight in the sample was 58.2 percent for middle school students and 68.2 percent for high school students. The rate of over weight was only 3.1 percent for middle school students and 4.8 percent for the high school students. The obese students in the total sample were a few (0.4 percent for middle school students and 0.7 percent for high school students). In this data, the percent of underweight students was much higher than that of obesity. Specifically for the total sample, 38 percent of the middle school students and 26 percent of the high school students were categorized as underweight. These results are consistent with previous studies reported that almost all of the sample was normal weight and the rate of obesity was really low (Cheong, Chang 2003 ; Kim 1998 ; Lee, Yoo 1997 ; Ryu, Yoon 1998). For boys, 72 percent were normal weight and 7 percent were overweight. For girls, 60 percent were normal weight and 40 percent were underweight.

2. Concern about obesity

Table 5 shows the concerns about obesity for middle and high school students and for boys and girls. For the question that is worried about obesity, 29 percent of the high school students and 12 percent of the middle school students answered 'strongly agree'. And 36 percent of the girls and 8 percent of the boys answered that they were always worried about obesity. For the second question that someone say you gain a weight, 33 percent of the high school students and 15 percent of the middle school students answered 'strongly agree'. And 37 percent of the girls and 7 percent of the boys answered 'strongly agree'. For the third question of looking at myself in a mirror, 32 percent of the high school students and 14 percent of the middle school students answered 'strongly agree'. And 34 percent of the girls and 12 percent of the boys answered 'strongly agree'. To summarize, high school students and girls had higher concerns about obesity than middle school students and boys.

Table 3. PIBW of the sample

	Middle school		High school		Boys		Girls	
	N(%)	mean ± SD	N(%)	mean ± SD	N(%)	mean ± SD	N(%)	mean ± SD
Underweight	131(56.7)	47.3 ± 4.2	40(13.1)	50.4 ± 2.2	32(14.2)	45.62 ± 4.8	140(44.4)	48.57 ± 3.6
Normal weight	66(28.6)	56.0 ± 1.8	127(41.7)	55.7 ± 2.0	50(22.2)	56.63 ± 2.1	144(45.7)	55.6 ± 1.8
Overweight	35(15.1)	65.6 ± 4.5	138(45.2)	66.7 ± 5.3	143(63.6)	67.43 ± 5.1	31(9.8)	62.21 ± 2.3
Total	231(100.0)		305(100.0)		225(100.0)		315(100.0)	

Table 4. BMI of the sample

	Middle school		High school		Boys		Girls	
	N(%)	mean ± SD	N(%)	mean ± SD	N(%)	mean ± SD	N(%)	mean ± SD
Underweight (< 18.5 kg)	86(38.2)	16.8 ± 1.2	77(26.3)	17.0 ± 1.2	45(20.5)	17.61 ± 0.68	119(39.8)	16.82 ± 0.9
Normal weight (18.5 − 24.9 kg)	131(58.2)	20.8 ± 1.6	199(68.2)	20.6 ± 1.6	157(71.7)	21.27 ± 1.8	173(57.9)	20.14 ± 1.4
Overweight (25.0 − 29.9 kg)	7(3.1)	26.2 ± 1.2	14(4.8)	27.6 ± 1.6	16(7.3)	27.19 ± 1.6	5(1.7)	27.0 ± 1.3
Obesity (> 30.0 kg)	1(0.4)	30.8 ± 0.0	2(0.7)	35.0 ± 5.8	1(0.5)	34.95 ± 0.0	2(0.7)	30.93 ± 1.2
Total	225(100.0)		292(100.0)		219(100.0)		299(100.0)	

Table 5. Concerns about obesity (Cronbach' alpha = .707)

	High school (%)					Middle school (%)				
	1	2	3	4	5	1	2	3	4	5
I am always worried about obesity.	29	20	13	23	29	15	12	28	20	12
When someone say you gain weight, I'm worried even though my weight did not increase.	36	21	10	18	33	17	17	15	18	15
I always look at myself in a mirror.	19	7	9	29	32	23	15	26	17	14
	Girls (%)					Boys (%)				
	1	2	3	4	5	1	2	3	4	5
I am always worried about obesity.	43	10	11	26	36	17	14	25	10	8
When someone say you gain weight, I'm worried even though my weight did not increase.	47	13	9	20	37	23	19	15	11	7
I always look at myself in a mirror.	24	4	8	30	34	24	17	35	13	12

1 'strongly disagree', 2 'disagree', 3 'so so', 4 'agree', 5 'strongly agree'

Table 6. Diet behaviors (Cronbach' alpha = .709)

	High school (%)					Middle school (%)				
	1	2	3	4	5	1	2	3	4	5
I pay attention to calorie when eating food.	36	27	23	22	20	8	32	23	6	3
I intent to buy diet food for weight control.	48	32	23	19	18	8	20	21	9	2
I have attempted weight control like a fast or a self-starvation.	46	30	20	17	23	10	26	16	11	2
	Girls (%)					Boys (%)				
	1	2	3	4	5	1	2	3	4	5
I pay attention to calorie when eating food.	48	19	29	26	20	7	25	17	6	4
I intent to buy diet food for weight control.	56	27	23	23	19	8	20	16	6	2
I have attempted weight control like a fast or a self-starvation.	53	24	24	19	24	9	21	14	9	3

1 'strongly disagree', 2 'disagree', 3 'so so', 4 'agree', 5 'strongly agree'

3. Concern about diet behaviors

Table 6 shows the general opinion about diet behaviors for the high and middle school students and for boys and girls. The results of the diet behaviors were the same of the concerns about obesity. For the first question of pays attention to calories when eating food, 20 percent of the high school students and 3 percent of the middle school students answered 'strongly agree'. And 20 percent of the girls and only 4 percent of the boys answered 'strongly agree' at the same question. For the second question of intention to buy diet food for weight control, 18 percent of the high school students and only 2 percent of the middle school students answered 'strongly agree', also 19 percent of the girls and 2 percent of the boys answered 'strongly agree'. For the third question of experience like a fast or self-starvation, 23 percent of the high school students and 2 percent of the middle school students answered 'strongly agree', and 24 percent of the girls and 3 percent of the boys answered 'strongly agree'. Therefore, high school student and girls had higher concern about the diet behavior than middle school student and boys.

The results of this study agree with those of some previous research that studied the actual diet experiences. For the study of Jang et al. (2002), within the sample, the rate of diet trial was 30.9 percent for the middle school students and 45.7 percent for the high school students, and they found that the experiences of diet trial increases with age. Also, for the study of Ryu, Yoon (1998), 56.2 percent of the high school students attempted weight control. When the sample is college students, especially female college students, they reported that the rate of diet trial was much higher (Kim 1998 ; Kim et al. 1998 ; Park et al. 1997).

4. Concerns about obesity and diet behaviors by the socio-economic characteristics

Results of ANOVA of concerns about obesity and of diet behaviors by socio-economic variables are presented in Table 7. For the concerns about obesity, there were signifi-

Table 7. Concerns about obesity and diet behaviors by the socioeconomic variables

		Concern about obesity			Concern about diet behaviors		
		M	SD	Scheffe	M	SD	Scheffe
Monthly allowance	Below 50,000	10.8	2.7	a	9.2	3.3	a
	50,000 – 100,000	9.4	3.4	b	7.3	3.4	b
	Over 100,000	8.4	3.2	c	5.9	2.7	c
	F		27.479***			53.867***	
Monthly household income	Below 2,000,000	8.9	3.2		6.4	3.0	a
	2,000,000 – 3,000,000	9.7	3.2		7.6	3.4	ab
	Over 3,000,000	8.9	3.6		7.2	3.4	b
	F		2.990			6.711**	
Education level of father	Less than high school	8.1	3.0		6.3	2.6	
	High school graduate	8.9	3.3		6.6	3.2	
	Some college or over	9.5	3.3		7.4	3.4	
	F		3.491*			4.607*	
Education level of Mother	Less than high school	8.7	3.2		6.8	3.0	
	High school graduate	9.1	3.3		6.8	3.2	
	Some college or over	9.4	3.3		7.4	3.5	
	F		1.015			2.210	
Occupation of father	None	8.7	2.5		7.8	3.5	
	professional	9.5	3.4		7.6	3.4	
	office worker	8.9	3.4		6.6	3.2	
	Sales & service	9.5	3.3		7.4	3.3	
	Production & other	8.8	3.1		6.4	3.0	
	F		1.572			3.398**	
Gender	Boys	7.1	2.9		5.6	2.8	
	Girls	10.6	2.8		7.9	3.2	
	F		0.801***			5.626***	
Occupation of mother	Non-employed	9.0	3.3		6.9	3.2	
	Employed	9.2	3.3		7.0	3.4	
	F	.111			.936		
School	Middle	8.3	3.3		6.0	2.6	
	High	9.8	3.2		7.7	3.6	
	F		0.397***			37.264***	

*: $p < .01$, **: $p < .05$, ***: $p < .001$

cant differences by monthly allowance, educational levels of the fathers, gender, and school. In terms of the concerns about obesity, the lowest group (less than 50,000 won) in monthly allowance had the highest levels of concerns on obesity, while the highest group (over 100,000 won) had the lowest level. As the level of the father increases, the student concerns about obesity also increases, but there were significant differences among the education levels of the father. For the variable of gender, female students had significantly more concerns about obesity than male students. And for the school, high school students had significantly more concerns about obesity than middle school students.

In terms of the diet behaviors, there were significant differences by monthly allowance, educational levels and occupations of the fathers, gender, and school. Like the results of the concerns about obesity, the lowest group (less than 50,000 won) in monthly allowance had the highest level of diet behaviors, while the highest group (over 100,000 won) had the lowest level. For the variable of household income, the middle group (2,000,000 won – 3,000,000 won) in the household income had the highest concerns about diet behavior, while the lowest group (less than 2,000,000 won) had the lowest concerns. The students' concerns about diet behaviors differed by both the educational levels and the

occupations of the fathers, and generally the concerns about diet behaviors increase as the educational levels of the father increases. Similarly, the results of the concerns about obesity, female students rather than male students and high school students rather than middle school students had more concerns about diet behaviors. These results are consistent with those of the '1998 National Health and Nutrition Survey' (1999) by the Korea Institute for Health and Welfare. It was reported that being female, the higher educational level, and the higher the household income had high probability of weight control.

5. Concerns about obesity and diet behaviors by body size

Results of ANOVA of concerns about obesity and of diet behaviors by the variable of body size are presented in Table 8. Unlike the results of the socio-economic variables, all variables (height, weight, PIBW, and BMI) in the body size were significant in the concerns about obesity and diet behaviors among the sample. For the variable of height, compared to the tall group, the middle and short groups had higher levels of concern about obesity. Also the middle group in the height had the highest levels of concern about diet behaviors, while the tall group had the lowest levels of concerns about diet behaviors. For the term of weight, unlike our expectation, the middle group (48−58 kg) had higher levels of concern about diet behaviors than both light and heavy groups. This result can be interpreted that students of middle weight are likely to be sensitive to thinness and try to lose weight, while students of over weight or obesity are likely to give up weight control. This phenomenon was shown in the students' concerns about obesity and diets by PIBW. That is, over weight students had lower concerns about obesity and diet behaviors than those with both under and normal weights. Finally, the variable of BMI was significant to concerns about obesity and diet behaviors, but there were no differences among sub groups.

6. Correlation between concerns about obesity and diet behaviors

Correlation coefficients between concerns about obesity and diet behaviors by each school are presented at Table 9. For both middle and high school students, there was a significantly positive relationship between concerns about obesity and diet behaviors. Especially, the correlation coefficient of high school students was larger than that of the middle school students.

Table 9. Correlation coefficient between concerns about obesity and diet behaviors

	Middle school	High school	Total
Correlation coefficient	.616***	.778***	.726***

***p <.001

Table 8. Concerns about obesity and diet behaviors by body size

		Concern about obesity			Concern about diet behaviors		
		M	SD	Scheffe	M	SD	Scheffe
Height	> 168cm	7.9	2.9	a	5.8	2.9	a
	160 – 168cm	9.9	3.2	b	8.0	3.4	c
	< 160cm	9.5	3.4	b	6.9	3.1	b
	F		18.616***			21.077***	
Weight	> 58kg	8.5	3.2	a	6.3	3.4	a
	48 – 58kg	10.0	3.2	b	7.8	3.2	b
	< 48kg	8.5	3.3	c	6.4	3.1	a
	F		39.746***			37.264***	
PIBW	Underweight	9.3	3.4	b	6.6	3.0	a
	Normal weight	10.0	3.2	c	8.1	3.4	b
	Overweight	8.1	3.0	a	6.1	3.2	a
	F		15.977***			19.346***	
BMI	Underweight (< 18.5kg)	8.3	3.3		6.3	3.1	
	Normal weight (18.5–24.9kg)	9.3	3.3		7.1	3.3	
	Overweight (25.0–29.9kg)	10.9	3.0		8.8	3.4	
	Obesity (> 30.0kg)	9.0	1.0		5.7	3.8	
	F		6.191***			4.615**	

*: p < .01, **: p < .05, ***: p < .001

Summary and Conclusion

This study investigated the concerns about obesity and diet behaviors with a sample of 565 middle and high school students in Ulsan. The results of BMI indicated that 58 percent of middle school students and 68 percent of high school students were normal weight and students with underweight were much more than students with overweight and obesity. For the results of BMI of boys and girls, 72 percent of the boys and 58 percent of the girls were normal weight, while 7 percent of the boys and only 2 percent of the girls were overweight. For the concerns about obesity and diet behaviors, the high school students had higher concerns than middle school students, and girls generally had higher concerns than boys. These results show that the students' thoughts and behaviors about diet is a matter of concern, especially for high school students and girls. As the results have shown, the students have considerable concerns about obesity, a school program needs to help the adolescents have appropriate dietary habits. In the school education, also recognition about correct diet methods be established for the health of the students.

The results indicated that the concerns about obesity and diet behaviors were significantly differentiated by the variables of gender, school, monthly allowance, and factors related to family backgrounds. Interesting findings were that the lowest group in monthly allowance had the highest levels of concern about obesity and diet behaviors, while the highest group in monthly allowance had the lowest levels. Considering the fact that the household incomes and the educational levels and occupations of the fathers were significant variables to the diet behaviors among the sample, the students' decisions to diet is not only a personal decision, but also the decision is affected by the family background. Therefore, in a family as well as in a school, education is necessary for health, proper exercise, and correct diet methods for the adolescents.

Finally, the results indicated that all variables (height, weight, PIBW, and BMI) in body size were significant in the concerns about obesity and diet behaviors. Especially, the middle groups with height and weight, and the normal group in PIBW, had higher concerns about obesity and diet behaviors than any other group. However, the group with over weight and the over weight group in PIBW had lower concerns about obesity and diet behaviors, and it can be interpreted that this may be a cause for over weight among the obese students. Thus, it is needed that the school program leads obese students to have positive concerns about obesity and to control their weights.

The adolescent period is important because it is the time for a person to grow rapidly in physical and mental health. Therefore, it is suggested that the joint efforts of school and family have to help the teenagers grow without obesity.

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