

Health Promoting Behavior and Self-Efficacy of Normal Weight and Obese Middle School Students by Gender

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I . Introduction

Obesity is generally a condition that accumulates an excess of fat in the body. Even though there are various definitions and standards on obesity, the Korean Infant Development Standard provided by the Korean Academy of Pediatrics has often been used in schools; mild obesity: 20-29%, middle obesity: 30-49%, high obesity: over 50%.

Obesity can develop at any age but it is known that the incident rate is higher especially among pre-school children and teenagers (Dietz 1983; Jeong 1989). Recently it has tended to rapidly increase among children and juveniles. Research conducted on students in primary, middle and high

schools of Seoul in 1984 and 1994 showed that the rate doubled during the 10 years, from 9% to 19% for boys and from 7% to 16% for girls (Lee 1996). Recent data from the Pusan Education Administration (2000) indicates that the percentage of obese students in 2000 is 8.4% increased from 7.1% in 1999. It is understood that this increase has something to do with an increase in preference for high caloric foods the like hamburgers and pizzas, influenced by the mass media and an indiscriminate introduction of the Western diet, an excess of stress from the college entrance test, an irregular diet, and a lack of exercise.

Because juvenile obesity is related to the number and not the size of fat cells, it is not well controlled by exercise or dietetic therapy.

About 80% of the obese children might become obese adults, which needs an effort at prevention with active management. Unfortunately, in our circumstances most juveniles don't put any effort toward preventing or treating obesity properly due to the college entrance test and due to job-training centered education. As a result, it causes a variety of physical (Dietz 1983; Jeong 1989; Moon and Park 1993), social (Kim 1991), and psychological (Jeong 1989; Kim 1994; Lee 1996; Odgen and Evans, 1996) problems. Considering the seriousness of juvenile obesity, it is very important to develop and use intervention programs such as appropriate diets, exercise and behavior modification to prevent obesity from becoming a base of the life time physical constitution and strength. The Ministry of Education and Human Resources Development (1996) actively recommended that schools should take action to prevent and manage obese students as part of a health promotion program. Supported by such a national policy, each school now operates school obesity management programs consisting of mainly dietetic therapy or behavior therapy (Kim and Kim 2001). Recently as the importance of cognitive and emotional factors are emphasized as determinants for an individual's health promoting behavior, a few studies on this area have been conducted (Kim, Jeong and Kim

2001).

According to the health promoting model (Pender 1996), self-efficacy is one of the most important predictive elements for health promoting behavior, and self-efficacy and health promoting behavior are influenced by sociodemographic characteristics such as gender and socioeconomic status (Rakowski 1988; Makuc, Freid and Kleinman 1989; Ratner et al. 1994). But there are conflicting study results about gender: the self-efficacy of school boys is higher than that of school girls in the existing study (Lee 2000; Kim, Han, Kwon and Lee 2001), while there is no difference between boys and girls (Kim Y.A. 2000). Studies on juvenile obesity by gender also show different results: girls conduct health promoting behavior better than boys do (Breslow and Enstrom 1980; Newell-Withrow 1986; Sherman 1992; Boehm et al. 1993; Kim 1999; Kim et al. 2001), boys do better than girls do (Kim and Nam 1997; Kim, Kim, Jung and Han 2000), and no difference exist between them (Lee 2000). Middle school students, who are in a transitional stage from being a dependent child to an adult, have the second sexual characteristics and a rapid physical growth, show some differences in the changes between boys and girls. For instance, girls reach puberty earlier than boys by 2 years, which shows that there is some difference between them in attention to the body or health (Kim 1999). Given this, the

self-efficacy and health promoting behavior can appear different according to gender, requiring further studies on it. Until now there have been few studies on how to change the self-efficacy and health promoting behavior between obese middle school students and their normal weight counterparts with respect to gender.

Under this background, we aimed to investigate the differences in self-efficacy and health promoting behavior between obese middle schoolers and normal weight middle schoolers by sex, and we attempted to help schools determine the direction of an effective school obesity management. The specific purposes were: 1) to compare general characteristics between normal students and obese students by gender, 2) to compare differences in the self-efficacy between normal students and obese students by gender, 3) to compare differences in the health promoting behavior between normal students and obese students by gender, and 4) to analyze correlations of the self-efficacy and health promoting behavior by gender.

II. Method

1. Study Design and Concept

This was a cross-sectional study to investigate the differences in the self-efficacy and health promoting behavior between obese students and normal weight students. The conceptual framework was based on Pender's health promoting model (1996). It selects: sex (boy/girl), age (middle school students), and weight (obese/normal) as individual characters and experiences; perceptible self-efficacy as cognition and emotion related to actions; and health promoting behavior as the result of actions.

2. Participants

The participants consisted of 360 middle school students in the seventh, eighth and ninth grades in six schools in Busan. Based on the physical examinations conducted by the randomly selected 6 schools (3 girls' schools, 3 boys' schools) in Busan, 30 obese students per school and 30 gender and grade

Table 1. Distribution of study population by obesity and sex

Obesity	Male(N=180)	Female(N=180)	Total(N=360)
No	90(50.0)	90(50.0)	180(50.0)
Mild	17(9.4)	52(28.9)	69(19.2)
Middle	60(33.3)	28(15.6)	88(24.4)
High	13(7.2)	10(5.6)	23(6.4)
Total	180	180	360

matched normal weight students were selected. However, the levels of obesity were not classified equally, so that the middle-level obesity was greatest in the case of the boys (60 boys, 33.3%) while the mild-level obesity was greatest in the case of girls (52 girls, 28.9%). In general, the middle obese students are 88 (24.4%), followed by the mild 69 (19.2%) and the high 23 (6.4%) The data are shown on Table 1.

3. Instruments

1) Demographic questionnaire

A self-report questionnaire was used to collect data on the general characteristics (sex, age, height and weight, level of obesity, and the existence of parents) ; the parent's education level, job, economic condition, the parents' obesity, and the participant's sibling's obesity.

2) Self-efficacy questionnaire

Self-efficacy was measured with a self-efficacy scale by Lee (2000), which was translated into Korean first and then back-translated into English by the bilingual. It was then modified for high school students with the well-known valid and reliable Self-Efficacy Scale by Sherer, Maddux, Mercandante, Jacobs and Rogers (1982), and was tested for face validity by 3 nursing professors. This scale consisted of 17 items on a 5-point Likert-type scale ranging from

disagree strongly to agree strongly(1) to agree strongly(5). Higher scores indicate higher self-efficacy. Cronbach's alpha were .71 for Sherer et al. (1982), .91 for Lee (2000), and .88 for this study.

3) Health promoting behavior questionnaire

Health promoting behavior was measured with a health promoting behavior scale by Lee (2000) then which was translated into Korean first and then retranslated into English. It was then modified for high school students with the well-known valid and reliable Health Promoting Lifestyle Profile by Walker, Vilkan, and Secrtes and Pender (1987), and was tested for face validity by 3 nursing professors. This scale consisted of 41 items with 6 subscales (9 items of nutrition, 6 items of responsibility for health, 7 items of exercise, 5 items of interpersonal relationship, 5 items of stress management, and 9 items of self actualization) on a 4-point Likert-type scale ranging from never perform(1) the reported behavior to routinely perform(4) the reported behavior. Higher scores indicate higher health promoting behavior. Cronbach's alpha were .93 for Walker et al. (1982), .90 for Lee (2000), and .89 for this study.

4. Procedure

Between Nov. 2000 to Dec. 2000 the participants were invited to complete the

questionnaires which were distributed by the researcher in the schools. in advance, The researcher informed the school-nurse this study and asked for the cooperation. All the subjects agreed to participate and responded to the questionnaire.

The collected data were analyzed by using the SAS (version 8.01) Win Program at the 0.05 significance level with a two-tailed test. The general characteristics of the subjects are calculated as a real number and as a percentage. The characteristic differences between normal weight students and obese students are clarified by a χ^2 test. The differences in self-efficacy and health promoting behavior between normal and obese students is tested by ANCOVA. The relation of self-efficacy and health promoting behavior is clarified by Pearson's coefficient of correlation.

III. Results

1. General Characteristics of Subjects

In case of boys, a significant difference between normal weight students and obese students appears in the study participants with obese siblings ($p=.008$) and the school records ($p=.000$), while in case of girls, the difference appears in the students with an obese father ($p=.010$), an obese mother ($p=.007$) and obese siblings ($p=.000$). Although it wasn't indicated in the following table, such factors as economic status, presence job, and educational levels of parents did not show a significant difference among the two study subject groups (Table 2).

Table 2. General characteristics of obese and normal weight (NW) students

Characteristics		Male(N=180)			Female(N=180)		
		NW (N, %)	Obese (N, %)	χ^2 (P-value)	NW (N, %)	Obese (N, %)	χ^2 (P-value)
Obese father	Yes	19(21.1)	24(26.7)	.76	15(16.7)	30(33.3)	6.67
	No	71(78.9)	66(73.3)	(.382)	75(83.3)	60(66.7)	(.010)
Obese mother	Yes	10(11.1)	15(16.7)	1.16	12(13.3)	29(32.2)	9.90
	No	80(88.9)	75(83.3)	(.281)	78(86.7)	61(67.8)	(.007)
Obese sibling*	Yes	4(4.9)	16(21.6)	9.61	7(8.3)	32(39.5)	22.83
	No	86(95.1)	74(78.4)	(.008)	83(91.7)	58(60.5)	(.000)
School record [†]	Upper	39(43.3)	16(17.8)	14.50 (.000)	26(28.9)	16(17.8)	3.31 (.190)
	Middle	36(40.0)	47(52.2)		53(58.9)	59(65.6)	
	Lower	15(16.7)	27(30.0)		11(12.2)	15(16.7)	

* only the students who have siblings.

[†] upper : rank of 1st - 10th, middle: 11th / 30th, lower : below 31st

2. Comparison of Self-Efficacy between Normal Weighted Students and Obese Students by Gender

The results from comparing the self-efficacy of normal weight students with that of obese students indicate that in the case of boys, normal students have a statistically significant higher score of self-efficacy than their obese counterparts (65.1 VS 56.7, $p < .0001$), while in the case of girls the two groups do not show a dramatic difference in the self-efficacy (56.7 VS 56.3, $p = .912$) (Table 3).

3. Comparison Health Promoting Behavior between Normal Weighted Students and Obese Students by Gender

The results from comparing the health promoting behavior of normal weighted students with that of obese students indicate that in the case of boys, normal students have a statistically significant higher score of health promoting behavior than their obese counterparts (118.2 VS 104.8, $p < .0001$), while in the case of girls, the two groups do not show a dramatic difference in the health promoting behavior (104.4 VS 104.3,

Table 3. Comparison of Self-Efficacy between Normal Weighted Students and Obese Students by Gender

Self-efficacy	Male(N=180) (mean ± SD)	Female (N=180) (mean ± SD)
Normal Weight	65.06 ± 9.45	56.68 ± 10.68
Obese	56.65 ± 8.80	56.28 ± 10.30
Mild	53.71 ± 8.03	56.35 ± 10.14
Moderate	57.20 ± 8.59	57.21 ± 10.20
Severe	58.00 ± 10.47	53.30 ± 11.85
F*(p-value)	25.85(<.0001)	9.01(.9118)

* F value of ANCOVA, with school record as covariate between normal weight and obese students by gender

Table 4. Comparison Health Promoting Behavior between Normal Weight Students and Obese Students by Gender

Health promoting behaviors	Male(N=180) (mean ± SD)	Female(N=180) (mean ± SD)
Normal Weight	118.21 ± 14.71	104.43 ± 16.66
Obese	104.76 ± 15.85	104.26 ± 17.33
Mild	99.41 ± 14.14	106.35 ± 17.50
Moderate	105.43 ± 16.26	101.00 ± 15.13
Severe	108.62 ± 15.42	102.50 ± 21.97
F(p-value)	28.61(<.0001)*	1.25(.2643)†

* F value of ANCOVA, with obese father, obese mother, obese sibling, and school record as covariates between normal weight and obese students by gender

$p=.2643$) (Table 4).

4. Correlation between Self-Efficacy and Health Promoting Behavior by Gender

The results from analyzing the correlation of the self-efficacy and health promoting behavior between normal weight students and obese students indicate that, regardless of sex, the two variables generally show a significant correlation. There appears a higher coefficient of correlation in obese students rather than normal weight students and a higher coefficient of correlation in boys rather than girls (Table 5).

IV. Discussion

This study was aimed to investigate relationship between self-efficacy and health promoting behavior between normal weighted and obese middle school students in both gender.

To control confounding variables impacting self-efficacy and health promoting

behavior except obesity, we first selected obese students through the physical examinations and then matched normal students with grade. In the course of analysis, we considered variables which showed significant differences between obese students and normal students as covariates. For instance, presence of obese siblings ($p=.008$) and school records ($p=.000$) were considered as covariates in boys, and presence of obese father ($p=.010$), presence of obese mother ($p=.007$) and presence of obese siblings ($p=.000$) in girls. However, previous researches (Han 1996; Bae 1998; Woo 2000) showed that the self-efficacy had something to do with educational level and school records. That is, the higher self-efficacy a student has, the better ability he or she has to solve problems, and to achieve educational goals. Accordingly, the school records were considered as covariates both boys and girls students.

In the case of the male students, normal weight students had a statistically significant higher self-efficacy than their obese

Table 5. Correlation between Self-Efficacy and Health Promoting Behavior by Gender

Correlation Coefficient	Male(N=180) (r, p-value)	Female(N=180) (r, p-value)
Normal Weight	.51(<.0001)	.49(<.0001)
Obese	.69(<.0001)	.67(<.0001)
Mild	0.74(.0007)	0.79(<.0001)
Moderate	0.70(<.0001)	0.40(.0351)
Severe	0.55(.0507)	0.75(.0119)

counterparts (65.1 vs 56.7). Among obese boys, middle or highly obese students showed a greater self-efficacy than mild ones. In the case of female students, the two groups didn't have a significant difference in the self-efficacy (56.7 vs 56.3). However, the highly obese girls had a lower self-efficacy than their mild and middle obese ones. The possible reasons were 1) most of obese girls were mild, so the weight differences was little, 2) because of the traditional idea (preference to sons) has been influenced on the self-realization, self-control, and self-esteem finally self-efficacy of girls (Lee 2000), 3) even though they were obese, boys students thought that they were in the course of physical development, and they could lose weight as they were growing in height. They didn't pay more attention to their appearance than the girls (Kim Y.S. 1999). Conversely even normal weight girls thought they were obese and should control their weight to become slimmer.

The self-efficacy is a belief that one could successfully conduct activities required for a certain result (Bandura 1977), one of the strongest social and psychological factors that could predict an individual's behavior that is related to health (Bandura 1977; Pender 1987, 1996). Obesity is related with both patterns of exercise or physical activities and eating habit for a long time. It is not easily managed in a short time and is needed considerable

efforts and "can-do" attitude to reduce obesity. Therefore, an obesity management program must promote self-efficacy. As this study shows, obese male students who are in a lower self-efficacy than their normal counterparts have a particular need to plan and facilitate an obesity management program to promote their self-efficacy. Especially girls show lower self-efficacy than boys regardless of obesity, so we should make an effort to enhance the self-efficacy of girls in schools or at homes. For instance, teachers in kindergarten, primary, middle school and high schools should try to give a sense of sexual equality, cheer and encouragement for girls, and teach step by step to give them a feeling of success.

Health promoting behavior scores of obese students and normal weight students show different : normal weight boys show a statistically significantly higher score than their obese counterparts in the health promoting behavior (118.2 vs 104.8), and mild obese boys have higher scores in the health promoting behavior than their middle or highly obese counterparts. But, there is no significant difference between the two groups (104.4 vs 104.3) in girls, and mildly obese girls have higher scores, especially in the health promoting behavior, than their middle and highly obese counterparts. In fact self-efficacy is considered as one of the most important variables to predict the health

promoting behavior in many previous study results (Weizel 1989; Palank 1991; Oh 1993; Gu 1994; Oh and Hong 1996; Pender 1996; Suh 1996; Bandura 1997; Kim et al. 2000; Lee 2000; Cha 2001; Kim et al. 2001), and this study shows similar to them.

In both the obesity group and the normal group, boys have higher scores in the health promoting behavior than girls. The results are different from Lee (2000) which indicated that there was no difference in the health promoting behavior of obese high school students and over weight middle school students; Kim et al. (2001) which indicates that there is no difference between male middle school students and female middle school students; and Kim (1999) which indicates that female primary school students showed significantly higher scores in the health promoting behavior. However, none of the three studies were adjusted demographic characteristics that could act as confounding variables. Among the above studies Kim (1999), on the primary school students, hardly compares with this study in a direct way because it used a different measurement method. On the other hand, the study showed similar results to Kim (2000). Moreover there was significant correlations between the self-efficacy and health promoting behavior in boys, girls, obese and normal weight, which confirms self-efficacy as a major factor influencing health

promoting behavior. Because there was more strong correlation between the self-efficacy and health promoting behavior in the obese than in the normal weighted, self-efficacy must be considered in the planning of an obesity management program for obese students.

Consequently, as obese boys show a significantly lower score in the self-efficacy and the health promoting behavior than normal weight boys, obesity prevention program should include not only dietetic therapy but also strategy to improve self-efficacy. However, the case of girls, as there is no significant difference of the self-efficacy and health promoting behavior between obese students and their normal weighted counterparts, it is difficult to expect much help in controlling obesity from a program for improving the self-efficacy. As girls generally show a lower self-efficacy compared with boys, it is important to encourage the self-efficacy for every girls in the dimension of school health. Finally, we failed to match obesity level among obese students between boys and girls students, so so we'd like to recommend repeat studies after making the proportions of each level of obesity between boys and girls students equal.

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ABSTRACT

Purpose : This study examines the differences in self-efficacy and health promoting behavior between obese students and normal weight students by gender; it tries to obtain basic data for the health guidance of obese students.

Methods : Data were collected from 360 students (90 normal weight males, 90 obese males, 90 normal weight females, 90 obese females) using questionnaires about general characteristics, self-efficacy, and health promoting behavior. There were analyzed with descriptive statistics (frequency, percentage, mean, standard deviation), and a χ^2 test, ANCOVA, and a Pearson's correlation of coefficient at the 0.05 significance level by using the SAS (version 8.01) Win Program.

Results : The score of self-efficacy appears that in the case of boys, obese students are significantly lower than their normal weight counterparts ($F=25.85$, $p<.0001$), while in the case of girls there is no significant difference between the two groups ($F=.01$, $p=.9118$). The score of health promoting behavior appears that in the case of boys, obese students are significantly lower than their normal weight counterparts ($F=28.61$, $p<.0001$), while in the case of girls there is no significant difference between the two groups ($F=1.25$, $p=.2643$). The relation of self-efficacy and health promoting behavior shows a statistically significant correlation in all cases: obese boys ($r=.69$, $p<.0001$), normal weight boys ($r=.51$, $p<.0001$), obese girls ($r=.67$, $p<.0001$), and normal weight girls ($r=.49$, $p<.0001$).

Conclusions : An evaluation study needs to see whether a program to encourage the self-efficacy of obese boys can be effective in health promoting behavior or weight control in the long run. As in this study more than half of the obese girls have mild-level obesity, a follow-up study should be conducted to examine the self-efficacy and health promoting behavior between middle or highly obese students and normal weight students.

Key Words : middle school students, normal weight, obesity, self-efficacy, health promoting behaviors, gender