Journal of Engineering and Applied Sciences 13 (Special Issue 4): 3719-3723, 2018
ISSN: 1816-949X

The Mediating Effect of Female College Student's Depression on the Association between Self-Esteem and Eating Attitude

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Abstract: This research aim to figure out the mediating effect of depression on the association between self esteem and eating attitude among female college students. The data was collected from 124 female college students in Korea. To find out the mediating effect of depression, 3 steps mediation process model was used for analysis. The instrument used EAT-26 for eating attitude, BDI for depression and Rosenberg's self-esteem scales. Pearson's correlation coefficient and regression analyses were used to analyze the data using SPSS 23. The self-esteem had a significant effect on depression (β = -0.53, $p<0.001$) in the first step and had a significant effect on eating attitude (β = -0.21, $p<0.05$) in the second step. Finally, in the third step, the self-esteem showed no significant effect on eating attitude and â value was decreased than the second step (β = -0.03, $p<0.5$) when the depression is mediated. As a result it has shown that the depression was found to have fully mediating effect between self-esteem and eating attitude. The preventive intervention program related to improve self esteem and possibly lower depression is required to prevent developing poor eating attitude.

Key words: Self-esteem, depression, eating attitude, weight control behavior, anorexia nervosa, bulimia

INTRODUCTION

Recently, due to the influence of TV or mass media that thin and skinny body shape is considered as the standard of beauty and more attractive, many young women want to be thinner and skinnier even though they are within normal range (Sung, 2005). Most of them think that the appearance or the way that someone looks is the most important criteria for an individual's wealth and successes, people with appeared beauty have more self satisfaction and self-esteem (Ko and Lee, 2015). According to the atmosphere of current society, even women with normal weight and Body Mass Index (BMI) try to lose weight to maintain skinny body shape and usually think that they are over weight even though they have lower weight than the normal (Kim and Yoon, 2000). For those reasons, many women have tried various weight control behavior sincluding unhealthy method using diuretics and forced fasting (Sung, 2005; Kim and Kong, 2004; Tomori and Rus-Makovec, 2000).

Actually, recent lots of research shows that many women evaluate themselves overweight or obese even though they have normal or lower in BMI and over half of them are dissatisfied with their body shape (Kim and Yoon, 2000; Hwang and Shin, 2000). For the case of dissatisfaction with own body shape, they tend to have negative feeling like depression and lower self-esteem (Oh and Park, 2011). For example, the students who considered them selves obese have the tendency to develop depression as comparing with standard weight and adolescents doing weight control behavior show more depressive compared with the otherwise (Kong, 2004). The negative emotion of depression tends to cause abnormal eating attitude and patients with eating disorder are more common to have high level depression in simultaneous (Wiederman and Pryor, 2000; Wolff *et al*., 2000; Chang and Sohn, 2014).

Eating disorder is usually classified as anorexia nervosa and bulimia nervosa. Both of them are related to fear of weight gain and desire for weight loss that have possibility to bring body dissatisfaction and abnormal eating attitude (Oh and Park, 2011). It was found that 80% of eating disorder is caused by abnormal eating attitude including forced weight control behavior. Based on the report, eating disorder mainly the problem of teenagers and young adults aged of 18 and 25 in emotional, social and physical aspects (Kim and Kong, 2004). Especially, women during these periods easily gain fat in their body due to developing of physical body and it makes them to do behavior related to eating disorder as socio-cultural tendency that skinny body is ideal beauty (Ahn and Song, 2007). Therefore, it is interesting to look into the effect of depression on eating attitude among these age groups. The eating attitude also closely is related to lower self-esteem. In other words, women with lower self-esteem easily tend to have eating disorder and some of researches explain that lower self-esteem is important part of abnormal eating attitude and behavior (Sung, 2005; Fisher *et al*., 1991).

Thus, the lower self-esteem if mediated by depression might affect eating attitude of the students and they are closely have a reciprocal relationship which means women with lower self-esteem and dissatisfaction on their body have the tendency to develop depression and it could be powerful factor to have an effect on abnormal eating attitude. This study aimed to determine the mediating effect of depression on the association between self esteem and eating attitude. As a researcher, I wanted to provide evidence about program development of eating disorder prevention vis-a-vis analysis of relationship among eating attitude, self-esteem and depression among female college students.

MATERIALS AND METHODS

Research design and model: The mediating effect was analyzed with based on 3 step procedures (Baron and Kenny, 1986). From literature review, self-esteem is the independent variable, depression placed as the mediator and eating attitude is the dependent (outcome) variable. The conceptual model is shown in Fig. 1.

To identify the mediating effect, procedure was followed using 3 steps. In the first step, it has to be confirmed that the independent variable would be a significant predictor of the dependent variable. In the second step it has to be confirmed that the independent variable would be a significant predictor of the mediator. In the third step, those are confirmed that the mediator is a significant predictor of the dependent variable and the previously significant independent variable in the first step has been greatly reduced (partial mediation) or if not significant (full mediation) when the mediator is inserted to the relationship between two major variables.

Subjects and data collection: The 124 female college students aged 18 and 24 years old participated in this survey. The structured questionnaire was distributed to 126 students, however, 2 copies were excluded from final analysis. To complete the questionnaire, the students took 10-15 min. The informed consent and confidentiality were observed throughout the research process where the students have the freedom to withdraw and refuse at anytime of the survey.

Statistical method: To identify the relationship among self-esteem, depression and eating attitude, Pearson's correlation coefficient was used. To figure out the mediating effect of depression on the association self esteem and eating attitude, regression analyses were used using SPSS 23. Sobel test (Sobel, 1982) was performed to determine if the relationship between the independent variable and dependent variable has been significantly reduced when mediator insert between two variables.

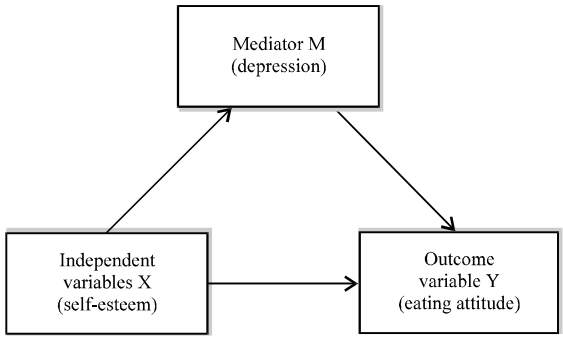

Fig. 1: The research model

Table 1: The reliability of tool

Tools	The number of items	Cronbach's alpha	
EAT-26	Anorexia -13 items	0.81	0.76
	Binge and commitment to food-6 items	0.75	
	Eating control-7 items	0.71	
Self-esteem	10 items		0.84
BDI	21 items		0.91

Survey tools

Eating attitude test-26 (Garner *et al.*, 1982): The eating attitude test-26 (EAT-26) by Garner *et al.* (1982) is composed of a 26 item standardized self-report measure of sign and symptoms of eating disorders. Higher score means worse eating attitude where in scores over 20 is considered the possibility of having anorexia nervosa as judged by pathological eating behavior (Garner and Garfinkel, 1979; Garner *et al.*, 1982). This screening tool has been useful in assessing "eating disorder risk" in young age group such as high school, college and other special risk groups. The EAT-26 is rated on a 6-point Likert scale (always, usually, oftentimes, sometimes, rarely and never) which based on how often the individual immerse in specific behaviors. The reliability of this tool is 0.94 (Garner and Garfinkel, 1979). The reliability of this study is shown in Table 1.

Self-esteem; Rosenberg (1965): The self-esteem reflects a person's overall subjection emotional evaluation of his or her own worth and this measurement tool was created by Rosenberg (1965). This scale consisted of 5-positive and 5-negative items with 5 point Likert scale. The higher score means better self-esteem. This tool was reliable at Cronbach's $\alpha = 0.80$ on Sung (2005) study and 0.84 in this study (Table 1).

Depression; Beck *et al.* (1961): Depression is consistently feeling a state of hopelessness, instability, sadness and despair. It is a state of low mood and the other way to activity which has an effect on the person's thought, action, emotions and well-being (Sung, 2005). In

this study, a state of depression was collected by depression inventory (Tomori and Rus-Makovec, 2000). The tool is consisted of 21 items including physiological, emotional, cognitional and motivational symptoms areas with self reported question naire. Beck is classified depression with normal (0-9 scores), mild depression (10-15 scores), depression (16-23 scores) and major depression (24-63 scores). The reliability of study (Wiederman and Pryor, 2000) was Cronbach's $\alpha = 0.85$. The instrument was reliable at Cronbach's $\alpha = 0.91$ (Table 1).

RESULTS AND DISCUSSION

General characteristics: The general characteristics of participants are shown in Table 2. It was found that the average body weight of 124 candidates was 53.6 kg and average BMI was 20.5. Both of them were within standard weight 55.4 kg and normal BMI (18.5-24.9). In the awareness of own body weight, 54 students (51.6%) responded that they think that they are obese or overweight. In the trial of weight control, 46 students (37.1%) are on a diet now and oftentimes, 88 of the students (71%) have been tried to go on a diet. The difference of the ideal weight and current weight was average -5.2 kg. The BMI as calculated on body weight and height was classified by the underweight group (20 students, 16.1%), normal group (94 students, 75.8%) and only 10 students (8%) were belonged to the group of overweight or mild obese. In the eating attitude result, pathological eating attitude group, over 20 scores was found to 22 students (17.3%) and the others 102 students were belonged to the normal group. The average of depression score was 9 and specific group was divided as Table 2.

Table 2: The general characteristics

Variables classification	n-values	Percentage	M (SD)
Awareness of own body weight			
Underweight	8	6.5	-
Average	52	41.9	-
Overweight	60	48.4	-
Excessive overweight	4	3.2	-
The enforced weight control now or not			
No	78	62.9	-
Yes	46	37.1	-
The current body weight (kg)			53.6 (7.1)
The ideal body weight (kg)	-	-	48.4 (5.6)
The difference of current body weight and ideal body weight (kg)	-	-	-5.2 (4.4)
BMI (Body Mass Index)			
Underweight group	20	16.1	-
Normal group	94	75.8	-
Overweight group	4	3.2	-
Mild obese group	6	4.8	-
Obese group	0	0.0	-
The eating attitude			
Normal group	102	82.3	12.13 (9.4)
Abnormal group	22	17.3	-
The depression scores			
Normal	74	59.7	9 (7.4)
Mild depression	28	22.6	-
Depression	17	13.7	-
Major depression	5	4.0	-
The self-esteem	-	-	12.12 (6.2)

Pathological eating behavior of subjects: To verify pathological eating behavior, 5 questions were asked subjects in Table 3. A remarkable result was found that even small students responded for "2-6 times every week" or "once every day or more" which mean that those behaviors require some treatment or intervention for eating disorder.

Correlation between self-esteem, depression and eating attitude: The correlation between self-esteem, depression and eating attitude is shown in Table 4. The self-esteem has moderate negative correlation ($r = -0.53$, $p<0.01$) with depression. The self-esteem has lower negative correlation effect ($r = -0.21$, $p<0.05$). The depression has lower positive correlation ($r = 0.36$, $p<0.01$) with eating attitude.

Analysis of research model: The tolerance limit of each regression expression was 0.72 and over 1 and VIF (Variance Inflation Factor) was 1.39 and under 10. It was turned out that there was no problem of multicollinearity among all variables. Durbin-Watson coefficient was 1.87 and closed to 2. It was verified that there was no correlation among residual variables. The mediating effect of depression on the association between self-esteem and eating attitude in female college students group is shown in Table 5. During, the first step independent variable, self-esteem has an effect on mediator, depression and was statistically significant ($\beta = -0.53$, $p<0.001$). The second step, independent variable, self-esteem was also found to have a direct effect on outcome variable, eating attitude was statistically significant ($\beta = -0.21$, $p<0.05$). In the third step, the effect on self-esteem and eating attitude has decreased than that of the 2nd step ($\beta = -0.03$) it was not significant in statistic ($p>0.05$). Finding has shown that depression was found to have fully mediating effect on the relationship between self-esteem and eating attitude. The Sobel test show statistically significant mediating effect of depression ($Z = 3.63$, $p<0.001$).

The research examined the mediating effect of depression on the association between self-esteem and eating attitude from 124 female college students and the conclusion was followed by below.

First, the average body weight of subjects, over half of them (53.6 kg) did not reach to the standard body weight (55.4 kg), 64 students (51.1%) recognize them

Table 3: The Pathological behavioral eating attitude of subjects

	Classification N (%)					
Eating behavior	Never	Once a month or less	2-3 times a month	Once a week	2-6 times a week	Once a day or more
Gone on eating binges where you feel that you may not be able to stop?	39 (31.35)	34 (27.4)	37 (29.8)	7 (5.6)	5 (4)	2 (1.6)
Ever made yourself vomited to control your weight or shape?	99 (79.8)	14 (11.3)	5 (4)	5 (4)	0	1 (0.8)
Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?	81 (65.3)	16 (12.9)	17 (13.7)	8 (6.5)	1 (.8)	1 (0.8)
Have you ever been treated for an eating disorder?	112 (90.3)	8 (6.5)	2 (1.6)	2 (1.6)	0	0
Have you ever been tried suicidal attempt or thought about it?	108 (87.1)	9 (7.3)	3 (2.4)	4 (3.2)	0	0

Table 4: The correlation of self-esteem, depression and eating attitude

Variables	Self-esteem	Depression	Eating attitude	Average	SD
Self-esteem	1	-	-	12.12	6.2
Depression	-0.529**	1	-	9.00	7.4
Eating attitude	-0.210*	0.361**	1	12.13	9.4

Table 5: The mediating effect of depression on the association between self-esteem and eating attitude

Steps	Variable	β	R^2	F-values
Independent V→mediator	Self-esteem→depression	-0.53***	0.28	47.32***
Independent V→dependent V	Self-esteem→eating attitude	-0.21*	0.04	5.64**
Independent V→dependent V	Self-esteem→eating attitude	-0.03	0.13	9.11***
Mediator→dependent V	Depression→eating attitude	0.35*		

*p<0.05, **p<0.01, ***p<0.001

overweight than normal even though their average BMI was 20. 5 within normal range. The result reflect current climate of society that prefer skinny and thin body and consider that as beauty. The fact that only 8% (10 students) were overweight or mild obese whereas the majority (92%) were all in under weight or normal group. This result corresponded with the previous studies that female in normal group evaluate them as overweight or obese compared with objective BMI (Kim and Yoon, 2000; Hwang and Shin, 2000; Choi, 2002). In Kong (2004)'s study, the result that 80% of eating disorder was caused by enforced weight control behavior imply that the subjects of this study were exposed with eating disorder thoroughly. The preventive education program related to eating habit and weight control behavior is required before developing to eating disorder.

Second, in the correlation among self-esteem, depression and eating attitude, the self-esteem has moderate negative correlation ($r = -0.53$, $p<0.01$) with depression. Self-esteem has lower negative correlation effect ($r = -0.21$, $p<0.05$). The depression has lower positive correlation ($r = 0.36$, $p<0.01$) with eating attitude. The result implied that the more self-esteem, the less depression while the lower self-esteem will lead to more depression which causes more abnormal eating attitude. This result is corresponded with the research (Kim and Kong, 2004) that the group that perform weight control showed more depression compared with not doing group and depression has positive correlation with eating disorder symptoms. Besides, it is corresponded with results of previous studies that the group that recognize them obese with lower self-esteem has more depression and the rate of depression at the same time among people with anorexia nervosa was 35-85% and patients with bulimia shows high scores in depression and anxiety (Kong, 2004). From above the results it is presumed that depression is related to eating disorder in close and depression symptoms is needed to be treated in advance and counter measure is needed to be prepare before depression is developed to eating disorder.

Third, it is turned out that depression has fully mediating effect on the association between self-esteem and eating attitude. Namely, self-esteem affected to eating attitude when the depression is mediated to the association of self-esteem and eating attitude but self esteem did not have a direct effect to eating attitude. This result was not corresponded with the previous studies that women with lower self-esteem mainly have eating disorder and lower self-esteem is an important part of abnormal eating attitude and behavior (Sung, 2005; Fisher *et al*., 1961). That result implies that there is some possibility to over look the mediation effect of depression on the association between the self-esteem and eating attitude.

CONCLUSION

In this study, it can be concluded that women with lower self-esteem tend to have more depressive mood which easily cause abnormal eating attitude. In addition,

Korean female college students have the tendency to distort them to more obese than real body shape and the countermeasure is much needed in preparing in recognizing their body shape in right way. The enforce weight control behavior causes severe eating disorder and it also is closely related to depressive disorder. Therefore, the intervention that prevent from depression is very much needed to be designed in order to prevent eating disorder. In other words, the result of this research implies the therapeutic intervention to deal with depression and to increase self-esteem should be formulated to reduce abnormal eating attitude leading eating disorder. Additional research is required about various causes of eating attitude with using stepwise regression to find out various mediating variables.

RECOMMENDATION

Further studies are required to identify the mediation effect of depression and other variables to be able to affect to the association between those variables.

ACKNOWLEDGEMENT

I wish to express my sincere thanks and gratitude to the participants who agreed to participate in the implementation of this project.

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