



The effect of self-esteem, attitude towards the body, and eating habit on cognitive reactivity

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Abstract: Increased prevalence of unhealthy lifestyles and dietary problems have been reported among the population especially female college students. This research aimed to test the model whether self-esteem, attitude towards body, eating habits, and Body Mass Index (BMI) affects cognitive reactivity in female college students. A total of 140 female university students aged 18-22 years participated in this study. Data analysis used Partial Least Square Structural Equation Modeling (PLS-SEM). A descriptive analysis using a one-way ANOVA test was performed to see whether there were differences among variables. Results show that self-esteem has a significant effect on body attitude and a negative significant effect on BMI and cognitive reactivity. Body attitude has a significant positive effect on eating habits. In contrast, it has a significant negative effect on BMI. The eating habit has a significant positive effect on cognitive reactivity. BMI has a significant effect on cognitive reactivity. Further, body attitude significantly mediates the relationship between self-esteem and eating habits. Also, body attitude significantly mediated the relationship of self-esteem with BMI. Additionally, the obese group has lower self-esteem and lower body attitude compared to normal and overweight groups.

Keywords: Body Mass Index; BMI; cognitive reactivity; female university student; psychological factors; self-esteem

Abstrak: Kenaikan prevalensi gaya hidup yang tidak sehat, masalah diet dialami oleh populasi khususnya mahasiswa perempuan. Penelitian ini bertujuan untuk menguji model apakah harga diri, sikap terhadap tubuh, kebiasaan makan dan Indeks Massa Tubuh (IMT) mempengaruhi reaktivitas kognitif pada mahasiswi. Sebanyak 140 mahasiswi, berusia 18-22 tahun berpartisipasi dalam penelitian ini. Analisis menggunakan *Partial Least Square Structural Equation Modeling* (PLS-SEM). Analisis deskriptif untuk menguji perbedaan antar variabel menggunakan ANOVA satu jalur. Hasil penelitian menunjukkan, harga diri signifikan positif mempengaruhi sikap terhadap tubuh, signifikan negatif mempengaruhi IMT dan reaktivitas kognitif. Sikap terhadap tubuh signifikan positif mempengaruhi kebiasaan makan. Berkebalikan, signifikan negatif mempengaruhi IMT. Kebiasaan makan signifikan positif mempengaruhi reaktivitas kognitif. Selanjutnya, sikap terhadap tubuh signifikan mediasi hubungan antara harga diri dengan kebiasaan makan, juga signifikan sebagai mediasi hubungan antara harga diri dengan IMT. Kelompok obesitas memiliki harga diri dan sikap terhadap tubuh negatif yang lebih rendah dibandingkan dengan kelompok normal dan berat badan berlebih.

Kata Kunci: faktor psikologis; harga diri; Indeks Massa Tubuh; IMT; mahasiswi; reaktivitas kognitif

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Introduction

The life of a college student requires adaptive skills since several substantial life-changing transitions occur when a young adult starts attending university (Sogari, Velez-Argumedo, Gómez, & Mora, 2018). The transition period from adolescence into young adulthood which includes transition in social relations, financial obligations, and expectations of academic achievement are phases entered by college students (Blair, 2016). The complexity of the situation could trigger psychological distress. Cognitive reactivity is psychological vulnerability marked by cognitive dysfunction and negative behavioral patterns in responding to suppressing situations (Scher, Ingram, & Segal, 2005). Inability to respond to challenges experienced by college student affect their cognitive reactivity. Van der Does (2002) identifies six main dimensions of cognitive reactivity which include helpless feeling, acceptance, aggression, control, avoiding risks, and contemplation. Further, it was found that cognitive reactivity significantly contributed to depression (Minkwitz et al., 2019).

Research showed that in a negative emotional situation, women tend to eat more than they do in positive emotional situations (Debeuf, Verbeken, Van Beveren, Michels, & Braet, 2018). A previous study also revealed that female college students often avoid certain kinds of food due to their concerns about weight (Deshpande, Basil, & Basil, 2009). Excessive cognitive reactivity could also contribute to excessive eating habits (Kakoschke, Aarts, & Verdejo-García, 2019). An individual will eat more when their cognitive process is vulnerable (Kakoschke et al., 2019; Tapera et al., 2017). Research by Hye Kyung and Jin Hee revealed that eating habit becomes one of the factors which contribute to developing obesity

(Hye Kyung & Jin Hee, 2009). Unhealthy eating habits such as irregular meal time, consuming junk food and high-calory snacks, and minimum consumption of fruits and vegetables were also identified when an individual enters university (Gerend, 2009; Sogari et al., 2018). Other factors which influenced eating habit and attitude were time restriction, comfortableness, cost, and food taste (Hebden, Chan, Louie, Rangan, & Allman-Farinelli, 2015).

College students are one of the groups with a higher risk of obesity. Less physical activity, a lot of stress, and unhealthy eating habits make this group more vulnerable (Ramalho, Dalamaria, & de Souza, 2012). According to several credible sources, college life is a critical period for young adults in terms of their food choices and weight gain. Some studies have shown that college students tend to gain more weight than those who do not attend University (Racette, Deusinger, Strube, Highstein, & Deusinger, 2008; Sogari et al., 2018; Vella-Zarb & Elgar, 2009). Another study also stated that age and educational degrees influence weight because they relate to the change in the daily activities of college students (Tapera et al., 2017).

Eating habits and attitudes during college life may exert a big impact on lifestyle during adulthood (Sogari et al., 2018). Unhealthy eating habits and attitudes could also trigger health issues including obesity. Obesity and overweight are conditions when abnormal or excessive fat accumulation occurs and may impair physical functions or increase health risks (Purnell, 2018). According to the Ministry of Health's Basic Health Research data, Central Java was one of the provinces with a higher prevalence of obesity in comparison with the national prevalence. In 2013, the prevalence of obesity in females was 32.9 % while males were 19.7% (Balitbangkes, 2013). Certain standards

must be set to assess obesity condition, and one of them is the Body Mass Index (BMI). BMI is the number obtained as the result of dividing the mass of the body in the unit of kilogram with height in the unit of meter. An individual with higher than or equal to 30 may be classified as obese (Alasmari, Al-Shehri, Aljuaid, Alzaidi, & Alswat, 2017). The case of obesity generally occurs mostly in females since their physical conditions are biologically more adaptive to store more fat (Davis, Zyzanski, Olson, Stange, & Horwitz, 2009). A study also found that dietary behavior, poor mental health, and physical or sexual childhood abuse were associated with overweight and obesity in women (Peltzer et al, 2014).

Body attitude is related to weight in women, which is stated that attitude toward the body is a reaction or judgment of self-physical appearance (Heider, Spruyt, & De Houwer, 2015). It relates to the physical condition of certain parts of the body (Montgomery Sklar, 2017). Also, it was found that females have more negative perceptions than males including dissatisfaction about certain parts of the body (Kurniawan, Briawan, & Caraka, 2015). While other studies stated that dissatisfied attitude towards the body is identified more in obese adolescents than adolescents with normal weight (Uçar, Aynur, Ayhan, Pınar, & Neriman, 2010). Body attitude relates to the dimensions of cognitive reactivity especially acceptance (Da Rocha Morgado, Campana, Da Consolação, & Tavares, 2014).

Furthermore, body attitude and obesity in adolescents related to their self-esteem (Da Rocha Morgado et al., 2014; Harriger & Thompson, 2012). Rosenberg stated that self-esteem is an individual's positive or negative attitude about themselves (Stets & Burke, 2014). Likewise, Abdel-Khalek (2016) defines self-esteem as a descriptive concept created by an individual about him or

herself. This concept is influenced by an individual's social interactions. Perrin, Boone-Heinonen, Field, Coyne-Beasley, and Gordon-Larsen (2009) explain that there is a connection between obesity and self-esteem in the adolescent that is caused by several things such as peer bullying, parental criticisms about body weight and beliefs among adolescents that they are unable to control their weights. Based on the explanations above, this research aimed to test the model whether self-esteem, attitude towards body, eating habits, and Body Mass Index (BMI) affect cognitive reactivity in female college students. Further, the hypotheses that will be developed in this study are as follows: H1.a = self-esteem has a positive and significant effect on body attitude and eating habits. H1.b = self-esteem has a negative and significant effect on BMI and cognitive reactivity. H2.a = body attitude has a positive and significant effect on eating habits. H2.b = body attitude has a negative and significant effect on BMI and cognitive reactivity. H3.a = eating habit has a negative and significant effect on BMI. H3.b = eating habit has a positive and significant effect on cognitive reactivity. H4 = BMI has a positive and significant effect on cognitive reactivity. H5.a = Body attitude mediates the relationship between self-esteem and eating habits. H5.b = Body attitude mediates the relationship between self-esteem and BMI. H6 = Eating habit mediates the relationship between body attitude and BMI. H7.a = BMI mediates the relationship between self-esteem and cognitive reactivity. H7.b = BMI mediates body attitude towards cognitive reactivity. H7.c = BMI mediates eating habits against cognitive reactivity.

Method

Participants in this research were female college students aged 18-22 years. The sampling

method used non-probability sampling with a convenience sampling technique. Before data collection, we notified the research participants about the purpose of the study.

The research participants attended the data collection on the agreed day that they deemed most convenient, between 17 and 27 June 2019. Explanations about the purpose of the study were given to all participants and those who agreed to participate signed the informed consent forms before we started the data collection. The participants filled in the questionnaires in a classroom. Permission for research projects and data collection were obtained from the Faculty of Psychology, Universitas Diponegoro, Semarang, Indonesia.

The instruments used in this study were adapted and translated using guidelines from Beaton, Bombardier, Guillemin, & Ferraz (2000). In the measurement translation, two clinical psychologists performed forward translation. Next, the Bahasa Indonesia version was back-translated by a language expert who had not seen the original English version. At this phase, we managed to reach a consensus about grammar, conceptual equivalence, and semantics. The pre-final version of Bahasa Indonesia measures was reviewed and approved by a panel of clinical psychologists and language experts. This version was tested to 5 female college students. They were asked if any terms and sentences were unclear or difficult to understand. The results show that the instruments were very easy to fill out and easily understood by the participants. Thus, the reliability and validity of the final instruments were tested.

The Rosenberg Self-Esteem Scale (RSES), is a scale that globally measures self-esteem through positive and negative feelings about oneself, which

contains 10 items. RSES is unidimensional. A higher total score portrays more positive self-dignity. Coefficient Cronbach's alpha RSES obtained for this research is 0.875.

The Dresden Body Image Questionnaire (DBIQ) consists of 35 items related to individual attitudes towards the shape of the body (Pöhlmann, Roth, Brähler, & Joraschky, 2013). DBIQ consists of five scale subs: acceptance of body, vitality, physical contact, fulfilling sexual needs, and self-aggrandizement. A higher total score portrays an individual's more positive attitude towards the shape of the body. Coefficient Cronbach's alpha DBIQ obtained for this research is 0.840.

Adult Eating Habit Questionnaire (AEHQ), measures eating habits or behavior of an individual which consists of 35 items and is divided into food responsiveness, emotional over-eating, enjoyment of food, satiety responsiveness, emotional under-eating, and slowness in eating (Hunot et al., 2016). Coefficient Cronbach's alpha AEHQ obtained for this research is 0.863.

Analysis using Partial Least Square Structural Equation Modeling (PLS-SEM) approach using WarpPLS 5 program. Data analysis techniques were carried out in two ways: descriptive analysis and statistical analysis. In a descriptive analysis, different tests were performed to see whether there were differences among variables. Statistical analysis was carried out in several stages, namely: 1) Testing the validity and reliability based on the factor loading value. Indicators are considered valid if they have a factor loading value > 0.5 so it could be concluded that the measurement met the convergent validity criteria (Chin, 1998); 2) Hypothesis testing.

Results

Validity and reliability

This study used a convergent validity test to ensure that the indicator used is indeed a construct of the latent variable. Convergent validity can be seen from the correlation between the indicator score and the variable score. The variable of self-esteem has 1 indicator, body image has 14 indicators, eating habit has 12 indicators, and cognitive reactivity has 10 indicators, and all these indicators have a factor value of less than 0.5. Therefore, these indicators will not be used in the model. The validity test results are presented in Table 1.

Table 2 shows that the AVE values on all variables are >0.5. A construct validity test was used to ensure that the indicator was indeed extracted from its latent variable. Thus, it could be concluded that all indicators used in this study have met discriminant validity.

Reliability testing used composite reliability, where the value must be >0.7 (Chin, 1998). Table 2 shows that the composite reliability value on the variables of self-esteem, body image, eating habits, BMI, and cognitive reactivity are all >0.7. This shows that the variables are consistent and can be used further for hypothesis testing.

Table 1.
Validity Analysis

Variable	Indicator	Outer Loading	(>0.5)	Variable	Indicator	Outer Loading	(>0.5)
Self-esteem	SE1	0.706	valid	Eating habit	EH1	0.561	valid
	SE2	0.714	valid		EH3	0.884	valid
	SE3	0.702	valid		EH4	0.595	valid
	SE4	0.668	valid		EH5	0.563	valid
	SE5	0.781	valid		EH6	0.605	valid
	SE6	0.674	valid		EH8	0.795	valid
	SE7	0.788	valid		EH9	0.511	valid
	SE9	0.774	valid		EH10	0.620	valid
	SE10	0.546	valid		EH12	0.848	valid
	Body attitude	DB1	0.649		valid	EH13	0.615
DB3		0.538	valid		EH14	0.646	valid
DB5		0.509	valid		EH16	0.544	valid
DB7		0.654	valid	EH17	0.599	valid	
DB8		0.543	valid	EH19	0.639	valid	
DB9		0.639	valid	EH21	0.522	valid	
DB10		0.623	valid	EH22	0.560	valid	
DB12		0.719	valid	EH24	0.554	valid	
DB13		0.392	valid	EH26	0.467	valid	
DB14		0.558	valid	EH28	0.509	valid	
DB16		0.843	valid	EH32	0.637	valid	
DB17		0.748	valid	EH33	0.538	valid	
DB18		0.642	valid	BMI	1	valid	
DB20		0.542	valid	Cognitive reactivity	LR3	0.655	valid
DB21		0.601	valid		LR5	0.675	valid
DB25	0.707	valid	LR7		0.508	valid	
DB29	0.768	valid	LR9		0.662	valid	
DB31	0.649	valid	LR11		0.735	valid	
DB32	0.604	valid	LR12	0.531	valid		
DB34	0.585	valid	LR13	0.611	valid		
DB35	0.621	valid	LR16	0.837	valid		
				LR17	0.718	valid	

Source: Primary data, 2020

Table 2.
Value of Average Variance Extracted (AVE)

Variable	Average Variance Extracted	
Self-esteem	0.504	Valid
Body attitude	0.524	Valid
Eating habit	0.732	Valid
BMI	1	Valid
Cognitive reactivity	0.892	Valid

Source: Primary data, 2020

Table 3.
Reliability Testing

Variable	Cronbach's Alpha	Composite Reliability	(Cut off >0.7)
Self-esteem	0.875	0.9	Reliable
Body attitude	0.84	0.867	Reliable
Eating habit	0.863	0.885	Reliable
BMI	1	1	Reliable
Cognitive reactivity	0.881	0.899	Reliable

Source: Primary data, 2020

Table 4.
G-Power Results

Variable	Number of Independent Variable	Size of Sample	Statistical Power (Cut off value >0.8)
Self-esteem	1	140	1
Body attitude	2	140	0.84
Eating habit	3	140	0.99
BMI	4	140	1

Source: Primary data, 2020

Table 5.
R Square Value

Variable	R ²	
Body attitude	0.363	Moderate
Eating habit	0.071	Weak
BMI	0.17	Weak
Cognitive reactivity	0.358	Moderate

Source: Primary data, 2020

Hypothesis testing

A statistical power analysis was performed for sample size estimation. With power value >0.8 , as is shown in Table 4, the size of the sample is adequate for the main objective of this study and can confidently read the estimated results in the model.

Structure Model testing through the coefficients of determination value (R^2) and path coefficients results are presented in Table 5 to Table 7.

The coefficients of determination value (R^2) can be categorized as strong if the R^2 value ≥ 0.67 , moderate ≥ 0.33 , and weak ≥ 0.19 (Hair, Ringle, &

Sarstedt, 2011). Table 5 shows that self-esteem has a moderate predictive ability of body attitude of 36.3% and cognitive reactivity of 35.8%. Furthermore, self-esteem has a weak predictive ability for eating habits of 0.7% and BMI of 1.7%.

Structural model testing aimed to determine whether there is influence between variables in the model. The T-statistic value would be compared with the T-table which is > 1.96 at a significance level of 5%. The results in the original sample indicate the direction of a positive or negative relationship, while the T-statistic shows the significance of the relationship.

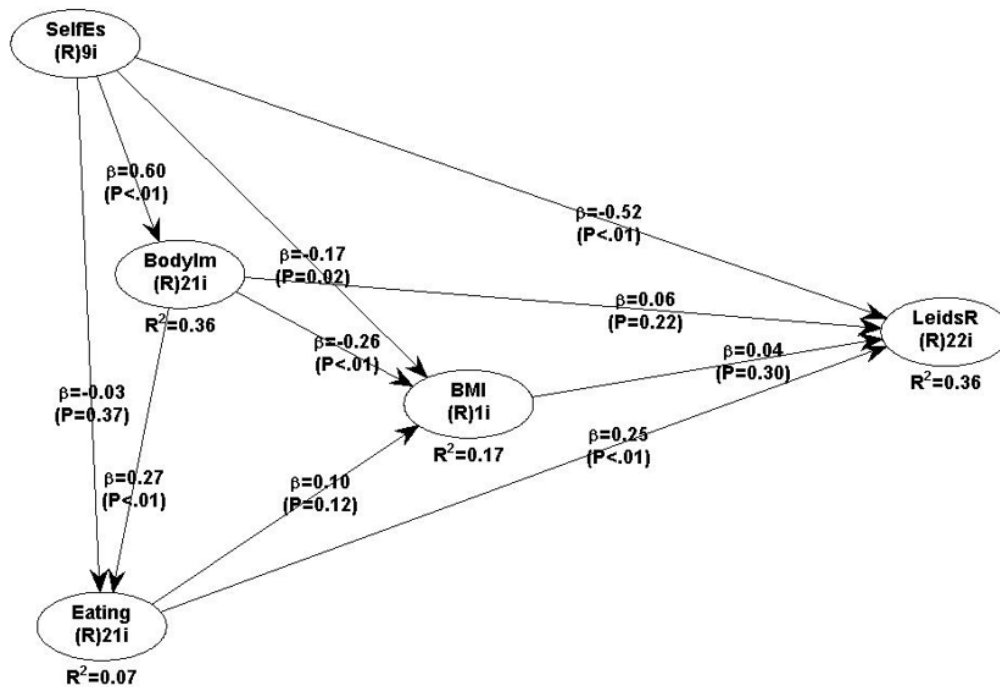


Figure 1.
Modeling Hypothesis Results

Table 6 shows that self-esteem has a significant effect on body attitude with a statistical T-statistic of 8.149 and not a significant effect on eating habits. Hypotheses 1.a is partially accepted. Self-esteem has a negative significant effect on BMI with a statistical T-statistic of -2.062 and Cognitive reactivity with a T-statistic of -7.267 Hypotheses 1.b are accepted. Next, body attitude has a significant positive effect on eating habits with T-statistic 3.481. Hypothesis 2.a is accepted. Body attitude has a significant negative effect on BMI with a T-statistic of -3.250, but not significant on cognitive reactivity. Hypothesis 2.b is partially accepted. The eating habit has no significant effect on BMI. Hypothesis 3 is rejected. The eating habit has a significant positive effect on cognitive reactivity with T-statistics 3.175. Hypothesis 3.b is accepted. BMI has a significant effect on cognitive reactivity. Hypothesis 4 is rejected.

From Table 7, it can be seen that body attitude significantly mediates the relationship between

self-esteem and eating habits. This can be seen from the T-statistic value of 2.862 which is greater than 1.96. Hypothesis 5.a is accepted. The mediation of body image variables is full mediation because the beta produced by testing the indirect effect is greater and more significant than the beta value of the direct relationship. Beta values can be seen through the original sample, where the indirect effect has a beta value of 0.166 while the direct effect has a beta value of -0.027. Furthermore, body attitude significantly mediated the relationship of self-esteem with BMI, seen from the T-statistic value of -2.707. Hypothesis 5.b is accepted. Body image variable mediation is partial mediation because the beta produced by testing the indirect effect is smaller than the beta value of the direct relationship. Beta values can be seen through the original sample, where the indirect effect has a beta value of -0.157 while the direct effect has a beta value of -0.167. Next, eating habits does not significantly mediate the relationship

Table 6.
Direct Effect Results

	Original Sample	β	SE	f^2	T-statistic	p-value		
Self-esteem → Body attitude	0.603	0.603	0.074	0.363	8.149	0.001	Significant	
Self-esteem → BMI	-0.167	-0.027	0.084	0.002	-2.062	0.021	Significant	
Self-esteem → Eating habit	-0.027	-0.167	0.081	0.055	-0.321	0.374	Not significant	
Self-esteem → Cognitive reactivity	-0.519	-0.519	0.075	0.296	-7.267	0.001	Significant	
Body attitude → Eating habit	0.268	0.268	0.079	0.074	3.292	0.001	Significant	
Body attitude → BMI	-0.260	-0.260	0.080	0.097	-3.250	0.001	Significant	
Body attitude → Cognitive reactivity	0.063	0.063	0.083	0.019	0.759	0.224	Not significant	
Eating habit → BMI	0.096	0.096	0.083	0.018	1.157	0.123	Not significant	
Eating habit → Cognitive reactivity	0.254	0.254	0.080	0.072	3.175	3.175	Significant	Accepted
BMI → Cognitive reactivity	0.054	0.044	0.084	0.01	0.651	0.651	Not significant	Rejected

Source: Primary data, 2020

Table 7.
Indirect Effect Results

	Original Sample	T - statistic	p-value		Accepted/ Rejected
Self-esteem → Body attitude → Eating habit	0.166	2.862	0.002	Significant	Accepted
Self-esteem → Body attitude → BMI	-0.157	-2.707	0.004	Significant	Accepted
Body Image → Eating habit → BMI	0.026	0.441	0.329	Not significant	Rejected
Self-esteem → BMI → Cognitive reactivity	-0.009	-0.150	0.441	Not significant	Rejected
Body attitude → BMI → Cognitive reactivity	0.055	0.663	0.255	Not significant	Rejected
Eating habit → BMI → Cognitive reactivity	0.005	0.083	0.466	Not significant	Rejected

Source: Primary data, 2020

Table 8.
One-way ANOVA Results

Variable	BMI	N	Mean	F	p	Bonferroni Test		
						Mean Difference (J)		
Self-esteem	Normal	100	28.50	5.051	0.008	Normal	Overweight	-0.29
	Overweight	14	28.79			Normal	Obese	3.04*
	Obese	26	25.46			Overweight	Obese	3.32
Body attitude	Normal	100	88.07	5.614	0.005	Normal	Overweight	2.28
	Overweight	14	85.79			Normal	Obese	6.53*
	Obese	26	81.54			Overweight	Obese	4.25
Eating habit	Normal	100	93.72	0.481	0.619	Normal	Overweight	2.29
	Overweight	14	91.43			Normal	Obese	-0.13
	Obese	26	93.85			Overweight	Obese	-2.42
Cognitive reactivity	Normal	100	69.28	1.688	0.189	Normal	Overweight	0.93
	Overweight	14	68.36			Normal	Obese	-5.41
	Obese	26	74.69			Overweight	Obese	-6.33

*p<0.05

Source: Primary data, 2020

between body image with BMI. Hypothesis 6 is rejected. Furthermore, BMI does not significantly mediate the relationship of self-esteem with cognitive reactivity, body image with cognitive reactivity, and eating habits with cognitive reactivity. Hypothesis 7 is rejected.

Descriptive and comparative results

A total of 140 female college students aged 18-22 years old (M = 19.93 ± 1.29) are involved in this research. Most participants were categorized as BMI normal (71.42%, N=100), while 10% (N=14) were categorized as overweight and 18.57% were

categorized as obese (N=26). Through closed questions, participants were also asked about several things. It is figured that only 7.5% of participants considered their weight is already ideal, among 25% who has a romantic relationship, 10% of them felt criticized by their partner about their physical appearances. Furthermore, most 75% of participants paid attention to the physical appearance of friends, model figures, and celebrities, 65% of the total subjects were given nicknames based on their physical appearance, which makes them feel discomfort.

Results from the one-way ANOVA test show that there was a significant difference in self-esteem in the BMI group ($F = 5.051$; $p = 0.008$) where obese subjects had lower self-esteem ($M = 25.46$) compared to normal subjects ($M = 28.50$) and overweight ($M = 28.79$). Furthermore, there was a significant difference in body attitude in the BMI group ($F = 5.614$; $p = 0.005$) where subjects with obesity had lower body attitude ($M = 81.54$) compared to normal subjects ($M = 88.07$) and overweight ($M = 85.79$). Then, there was no significant difference in eating habits ($F = 0.481$; $p = 0.619$) and cognitive reactivity ($F = 1.688$; $p = 0.189$) in the BMI group.

Further, post hoc comparisons using the Bonferroni correction indicated that the self-esteem of group with normal BMI ($M = 28.50$) was significantly different from the obese group ($M = 25.46$). The body attitude of normal group ($M = 88.07$) was significantly different from the obese group ($M = 81.54$).

Discussion

This research shows that self-esteem significantly affects body attitude. In several studies, female college students who have positive self-esteem will be able to assess and evaluate themselves positively and can accept their physical condition and appearance (Gatti, Ionio, Traficante, & Confalonieri, 2014; Wasylkiw, MacKinnon, & MacLellan, 2012). Satisfaction with body image significantly influences self-esteem in young women (Pisitsungkagarn, Taephant, & Attasaranya, 2014). Interestingly, in this study, self-esteem does not significantly affect eating habits. We assumed food as a coping mechanism to endure the problem that they encounter during their college life. Adolescents who use this coping strategy were reported to develop less healthy eating habits

(Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009). Chung, Kim, and Woo (2007) in their research stated that eating habits will be influenced by stressful situations related to their class activities. Besides, the rhythm of campus life where classes are held in the morning and many tasks are situational that affect their eating habits.

It was revealed in the result of this research that self-esteem influence one indicator of weight state, which is BMI. This finding agrees with the previous studies which proved that self-esteem was significantly associated with weight status (Alvani, Mehrshad, Hosseini, & Kimura, 2016). According to Strasburger (2010) evaluation of the body is influenced by some factors, one of them is BMI. BMI correlates with the satisfaction or dissatisfaction of an individual toward an individuals' body. For women, their physical appearance, especially body weight, is the most crucial point that can influence self-esteem (Gentile et al., 2009). Obesity or overweight is one of the most determining factors of self-esteem and body image among women (Unlu, Aykut, Borlu, & Kaner, 2019). This is supported by the findings in this study that participants with obesity have low self-esteem. A college student with medium and high self-esteem has the highest probability to be in a healthy weight condition, and less likely to be overweight (Alvani et al., 2016). According to other studies, the association between self-esteem and BMI among females was the strongest when they are between ages 22 to 32 (Kiviruusu et al., 2016).

This research found that self-esteem influences cognitive reactivity in female college students. In line with it, Teixeira, Pereira, Marques, Saraiva, and Macedo (2016) state that an individual's self-esteem strongly affects their reactivity level. Low level of self-esteem in women

is related to cognitive factors such as perfectionism, and this factor promotes the development of eating disorders like binge eating because they doubt their ability to lose weight. Ostovar, Md Nor, Griffiths, and Chermahini (2017) said that cognitive reactivity can be seen from 5 things namely: hopelessness (suicidality), acceptance (coping), aggression, control (perfectionism), risk aversion, and rumination. Various studies support the results of this study which show self-esteem is significantly negatively correlated with aspects of cognitive reactivity. A study conducted by Cakar (2014) on 338 students shows that low self-esteem can affect the emergence of automatic thoughts in the form of hopelessness. Besides, low self-esteem correlates with low self-acceptance (Macinnes, 2006), high-risk aversion (Johanson, 2000), habitual rumination (Phillips & Hine, 2016), maladaptive perfectionism (Rice & Lopez, 2004), and high aggressiveness in college students (Trzesniewski et al., 2006). Clasen, Fisher, and Beevers (2015) add that someone who has low self-esteem will show a pattern of cognitive reactions that tend to have high levels of sadness and are simultaneously more susceptible to depression. It is also worth mentioning that Clasen, et al (2015) and Rosenberg –in Nelis & Bukowski (2019)– explain that self-esteem also has a reactive response towards emerging distress in daily life.

Attitude toward the body has proved to significantly affect individuals' eating habits. Further, it also affects body weight. The obese female participants showed a lower body attitude compared to the other two groups. A cross-sectional study of students conducted by Aoun, et al (2019) revealed the cognitive, behavioral, and emotional aspects of eating habits by analyzing body mass index, circadian rhythm, eating behavior, and anxiety in individuals. The results of

this study indicate the influence of gender on eating behavior. Women reportedly exhibit emotionally higher eating behavior than men. Impulsivity in eating behavior is related to individuals' perceptions about their body which ultimately affects cognitive restraint, which is the intention to control food intake. Obesity is associated with the behavior and cognitive conditions of individuals (Jansen, Houben, & Roefs, 2015).

Based on this study, eating habit and attitude among female college students was also related to their cognitive reactivity. This finding is consistent with a study among university students in Lebanon which showed significant correlations between three cognitive and emotional domains related to eating habits (Aoun et al., 2019). Females turn out to be more emotional eaters than males, they tend to overcome their negative feelings by eating, while men choose other ways of coping such as gambling or alcohol drinking (Aoun et al., 2019). Women in this research showed that their eating habits and diet d were related to their acceptance of certain parts of the body. This finding agrees with another study which also highlighted a link between dieting and negative thinking, which fosters unhealthy eating patterns among adults (Wehling & Lusher, 2019).

Furthermore, it was found that an individual's way of thinking is more affected by their perception of their weight rather than the actual weight. Individuals who perceive their bodies as too fat, even though the BMI (Body Mass Index) calculation shows a normal reading, will tend to assume that food is something that needs to be avoided. Also, Clasen et al., (2015) add that individual way of thinking is influenced by their self-esteem. So, even though individuals with high body weight will tend to have positive ways of thinking if they have positive self-esteem. Body-

weight in this study also proved to not affect a mediating relation of all variables.

Research conducted by Alvani, et al (2016) on 450 students showed a strong relationship between a person's self-esteem and body weight. Overweight individuals are reported to have lower self-esteem compared to normal-weight individuals. Further, they recommend the clinical practice to add self-esteem improvement programs in their weight management. Besides self-esteem, gender also influences body weight. Unhealthy dietary behavior is often associated with low self-esteem (Mostafavi, Azadbakht, & Daniali, 2013). This research also revealed that the correlation between self-esteem and eating habit is mediated by body image among female college students. This finding is related to the result of a study held by Kim and Lennon which found that low self-esteem, body dissatisfaction, and overall appearance dissatisfaction were associated with the risk of eating disorder tendencies (Kim & Lennon, 2007). Women who are dissatisfied with their bodies usually have lower self-esteem and showed more eating disorder symptoms (Kim & Lennon, 2007). Santamaría, Vázquez, Caballero, and Rodríguez (2009) state that the same eating habit may have a different effect on an individual with normal weight or excessive weight. Women with normal weight are reported to control their food more easily than women with excessive weight. Attitude toward the body generally correlates with the pattern or eating habits of an individual. Hidayah and Bariah (2011) show that attitude toward the body reflects an individual's effort to control food and it affects the eating habit. Dissatisfaction about the shape of the body may push an individual to have restricted diets, over workout, and refusing to digest food by vomiting or consuming laxative pills. This finding is also consistent with a study by Kesgin which found that there were some studies

about the relationship between self-esteem and eating disorders among adolescents in clinical practices, and the main issue underlying this connection is women's self-criticism regarding their physical appearance (Kesgin, 2019).

Uçar et al., (2010) suggest that there is a positive relationship between self-esteem and attitude towards the body, individual satisfaction with the body influences positive self-acceptance and evaluation. Individuals who have a positive attitude towards the body can accept their strengths and weaknesses without feeling inferior (Hasmalawati, 2017). High levels of self-esteem have been shown to increase individual adjustment and health-related behaviors (Yun et al., 2019). Attitudes toward the body moderate the effect of self-esteem on individual body weight. Research conducted by O'Dea (2006) recommends that in obesity prevention programs, efforts are needed to build clients' self-esteem first. By developing healthy eating habits and regular physical activity without fear of food, this will encourage the creation of positive attitudes towards the body that are beneficial in the process of regulating body weight. Positive evaluation of the body provides an opportunity to achieve a healthier physical and mental state.

Conclusion

The findings showed that positive self-esteem is an essential variable in determining the way individuals view their bodies and then reactivity to think about a situation. Furthermore, the attitude towards the body would affect individual eating habits and body weight. Positive eating habits contribute to resolving eating habit issues. Students with a positive attitude towards the body indirectly affect the strong relationship between self-esteem and eating habits. Based on the results

described above, the implications that can be drawn out from this research are the need for developing psychological intervention programs related to the topic of self-esteem and its relation to the health-education promotion program to enhance lifestyle decisions.

The generalizability of the findings of this study is limited because we only took the samples from female students of only one university; the size of the sample may not be very representative. For future studies, samples from different universities may provide a more inclusive picture.

Future researchers may also need to take into consideration participants' socio-economic status, food behavior, and lifestyle factors. Also, comparison with male university students combined with cross-cultural studies will provide more comprehensive results and benefits.

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