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**Sanjay Trama**

Research scholar, Department of  
Physical Education, Panjab  
University, Panjab, India

**Dr. Anju Lata Dviwedi**

Associate professor, MCM DAV  
College, Chandigarh, Panjab,  
India

## A study on relationship between eating attitude and BMI among male college students

**Sanjay Trama and Dr. Anju Lata Dviwedi**

### Abstract

Poor eating habits are an important public health issue that has large health and economic implications. This paper is intended to examine the relationship of Eating Attitude and its subcomponents on BMI level among male college students. The study population included 500 (250 rural and 250 urban) male college students from different colleges of Haryana state. Undergraduate, graduate, and postgraduate students who were in the adolescent age group of 18–25 years were included in the study. For assessment of Eating attitude and its 3 subcomponents Dieting, bulimia food preoccupation and oral control EAT-26 scale was used on healthy male college going students. For assessing BMI status of the students BMI criteria for Asian population proposed by WHO was used. T- test as inferential statistical tool was used to compare means among various BMI levels in male college students. ANOVA was applied to find significant difference in eating attitude of students according to BMI level. Level of significance was taken at 5%. For descriptive analysis, mean and standard deviation values were employed. Pearson's product-moment correlation coefficient (r) with 95% confidence ( $p < 0.05$ ) was applied to determine relationships between dependent and independent variables. All statistical analyses were performed with the use of SPSS 25 statistical software. Highly significant ( $p < 0.000$ ;  $p < 0.001$ ) positive correlation was visible between the two variables according to Pearson's Correlation Coefficient (r 0.2628). The mean score and standard deviation of the participants EAT-26 score was found to be  $19.41 \pm 13.98$ . Body Mass Index (BMI) was noticed among college students with mean and standard deviation ( $22.51 \pm 2.61$ ). The value of ANOVA is found to be 74.6 which is significant at 5% level of significance, this shows that there is a significant difference in eating attitude of students according to BMI. There was a significant difference in eating attitude of underweight students when compared to overweight Obese I and Obese II and normal weight students when compared to overweight Obese I and Obese II. The value of F-statistics (52.184) is found to be significant at 5% level of significance, so we can say that there is a significant difference between the various variables under study.

**Keywords:** Eating attitude, bulimia nervosa, BMI, obesity, dieting, college students

### Introduction

#### Eating attitude and eating disorders

Eating behaviour is a complex interaction of physiological, psychological, social, and genetic elements that determine meal schedule, food intake quantity, food preference, and food choice. Obesity and its associated co-morbidities (metabolic syndrome, coronary artery disease, sleep apnea, skeletal problems, hyperlipidemia, and hypertension) have increased rapidly over the past 30 years, highlighting the need for a comprehensive understanding of its aetiology. The study of eating behaviour strives to describe eating patterns and food preferences, to explain why individuals gravitate toward various behaviours and food selections, and to propose strategies for bringing about successful changes in behaviours that can be modified. Obesity and associated diseases can be effectively treated if we understand the underlying factors that govern eating behaviour. (Magni *et al.* 2009) <sup>[3]</sup>

The evaluation of eating attitude can be utilised to identify the interaction between individuals and food, as well as their related behavioural choices. By altering the total health, it is obvious that diverse food-related behaviours may lead to social and cultural changes in non-communicable diseases. Eating is not simply a physical activity, but is also tied to an individual's cultural and psychological ideas, which influence his physical condition and health behaviour.

**Corresponding Author:**

**Sanjay Trama**

Research scholar, Department of  
Physical Education, Panjab  
University, Panjab, India

An increasing number of individuals, particularly adolescents, suffer from eating disorders, which are defined by serious disturbances in eating patterns and eating-related behaviour. (Jones, 2001) [2]. Garner created the EAT-26 to assess eating disorders such as anorexia nervosa and bulimia nervosa symptoms, including dieting behaviour, thinness obsession, vomiting after eating, and food preoccupation. (Garner., *et al.*, 1982) [1]

Eating disorders are significant problems characterized by persistent eating practices that have a negative influence on one's health, emotions, and capacity to function in crucial areas of life. Anorexia, bulimia, and binge-eating disorder are the most prevalent eating disorders. Most eating disorders are characterized by a preoccupation with weight, body form, and food that leads to harmful eating practices. These actions can have a substantial impact on your body's ability to obtain adequate nutrients. Eating disorders can cause harm to the heart, digestive system, bones, teeth, and mouth, as well as contribute to the development of other ailments. Eating disorders typically manifest in adolescence and early adulthood, though they can manifest at other periods. You can return to better eating habits and sometimes reverse major consequences caused by eating disorders with treatment.

Anorexia nervosa is a potentially fatal eating illness marked by an unusually low body weight, an acute dread of gaining weight, and a skewed view of body weight or shape. Anorexia nervosa typically begins throughout adolescence and is more prevalent among both female and male teenagers. Teenagers with anorexia nervosa continue to feel hungry, but they refuse to consume even a small amount of food. (Stoutjesdyk & Jevne, 1993) [5].

Bulimia nervosa is a severe and sometimes fatal eating disorder. Bulimia is characterized by bingeing and purging episodes accompanied by a loss of control over eating. Many individuals with bulimia restrict their meals during the day, which frequently results in increased binge eating and purging. During these episodes, you often consume a significant amount of food in a short period of time, followed by an unhealthy attempt to rid yourself of the excess calories. Because of guilt, humiliation, and an acute fear of gaining weight as a result of overeating, you may induce vomiting, over exercise, or use laxatives to eliminate calories.

When you have binge-eating disorder, you consistently consume excessive amounts of food (binge) and feel powerless over your eating. You may eat rapidly or consume more food than anticipated, even when you're not hungry, and you may continue to consume food long after you're no longer hungry. After a binge, you may have feelings of guilt, disgust, or embarrassment due to your behaviour and the quantity of food consumed. Unlike someone with bulimia or anorexia, you do not attempt to compensate for this behaviour through excessive activity or purging. Due to embarrassment, binge eaters may eat alone to conceal their behaviour. A new episode of bingeing occurs at least once every week on average. You may have a normal, overweight, or obese weight.

#### **Indicators of an eating disorder include**

- skipping meals or finding reasons for not eating
- adopting an abnormally stringent vegetarian diet
- Adopting a restrictive exercise regimen.
- Overemphasis on healthy eating
- Preparing one's own meals rather than eating with the family
- Absence from typical social activities

- Persistent anxiety or complaints about being overweight and thoughts of weight loss
- Frequent mirror inspections for perceived defects
- Consuming repeatedly big quantities of sweets or high-fat foods
- Weight loss pills, laxatives, and herbal products
- Excessive exercise
- Calluses on the knuckles due to vomiting inducement
- Problems with tooth enamel loss that may indicate frequent vomiting
- Leaving meals to use the restroom
- Consuming far more food than is deemed typical at each meal or snack
- Expressing despair, contempt, remorse, or embarrassment regarding eating habits
- Eating in private

Although eating disorders can affect people of all ages, they typically manifest in adolescence and early adulthood. Certain factors, particularly family history, may raise the likelihood of having an eating disorder. Individuals with eating disordered parents or siblings are much more prone to develop eating disorders themselves. A history of an anxiety condition, depression, or obsessive-compulsive disorder is common among individuals with an eating disorder.

Dieting increases the likelihood of having an eating disorder. The effects of starvation on the brain include mood changes, rigidity of thought, anxiety, and loss of appetite. There is substantial evidence that many of the symptoms of an eating disorder are, in fact, signs of hunger. In sensitive individuals, starvation and weight loss may alter brain function, perpetuating restrictive eating behaviours and making it difficult to return to regular eating.

#### **BMI as index for classification of weight category**

Developing countries are adopting a junk food-based, sedentary lifestyle, and dietary behaviour is experiencing significant, transformative changes that are directly related to the "New World Syndrome." Obesity has been identified as part of the initial wave of this New World Syndrome, which is followed by a multitude of chronic diseases (cardiovascular disease and diabetes in particular) that impose a significant socioeconomic and public health burden on emerging nations. These have now attained the proportions of a global epidemic and should be recognised as the most neglected public health issue of the present day. (WHO 1998) [7]

According to the World Health Organization, BMI is "a basic indicator of weight-to-height that is routinely used to identify underweight, overweight, and obesity in people." Obesity, as defined by a high body mass index, is a risk factor for a number of the world's top causes of death, including cardiovascular disease, stroke, diabetes, and several forms of cancer. Obesity does not directly cause any of these adverse health effects, although it can enhance their occurrence. According to the graph, it is one of the main global risk factors for death. According to the World Health Organization (2016), there are over 2 billion overweight adults, 650 million of whom are deemed obese (BMI 30 kg/m<sup>2</sup>). This corresponds to 39% (39% of males and 40% of women) of adults aged 18 or older being overweight, with 13% being obese. Between 1975 and 2016, the worldwide prevalence of obesity nearly tripled. According to current estimates, the majority of the world's population resides in nations where overweight and obesity kill more people than underweight. If current trends continue, it is projected that by 2025, 2, 7 billion adults would be overweight, over 1 billion individuals

will be impacted by obesity, and 177 million persons will be severely affected by obesity. (Ritchie & Rose, 2017) <sup>[4]</sup>

**Criteria for determining BMI level**

The BMI of the participants is determined by calculating their height and weight using the formula BMI = weight / (height) metres. The cut offs for body mass index (BMI) proposed by the WHO expert committee for Asian people are listed in the table below. (World Health Organization. Regional Office for

the Western Pacific, 2013)  
 Classification of Weight by BMI  
 Classification BMI  
 Underweight Not obese <18.5  
 Normal weight 18.5–22.9  
 Overweight 23–24.9  
 Obese ≥25

**Results and Analysis**

**Table 1:** Socio-Demographic profile of students in the study

Parameter	Descriptive statistics
<b>Age(years)</b>	
17-19	202(40.4)
20-22	284(56.8)
23-25	14(2.8)
Minimum – Maximum	17 – 25
Mean ± SD	19.78±1.45
<b>Habitat</b>	
Urban: Rural	250: 250
<b>BMI(Kg/m<sup>2</sup>)</b>	
Underweight	10(2.0)
Normal weight	306(61.2)
Overweight	113(22.6)
Obese Grade I	67(13.4)
Obese Grade II	4(0.8)
Minimum – Maximum	17.90 - 30.86
Mean ± SD	22.51±2.61

Table 1, depicted profile of students in the study. During the study 500 male students (250 urban and 250 rural) in the age group of 17 to 25 years with mean 19.78±1.45 were enrolled where 40.4% students fall in (17-19 years), 56.8% students in (20-22 years) and only 2.8% students fall in (23-15 years) age category. Body Mass Index (BMI) was noticed from 17.90 to 30.86 showing that both underweight and obese students were

existed among college students with mean and standard deviation (22.51±2.61). According to Asian population criteria largest proportion of students were categorized normal weight 306(61.2%), among all where 113 (22.6%) students were overweight the rest 71 were Obese containing 67 (13.4%) Obese grade I and 4 (0.8%) Obese Grade II and only 10 (2%) students were underweight.

**Table 2:** Descriptive statistics related to Eating attitude among students and its domains

	N	Minimum	Maximum	Mean	Std. Deviation
Dieting	500	0	27	10.85	5.492
Bulimia Food Preoccupation	500	0	16	5.05	3.156
Oral Control	500	0	15	5.48	2.910
Eating attitude score	500	0	43	19.41	8.802

Table 2 depicted Eating attitude among students and its domains. The researcher have taken data of 500 respondents and used a scale EAT-26 which results that for dieting the minimum score is found to be 0 and maximum score is found to be 27 with mean 10.85 and standard deviation 5.492, for bulimia food preoccupation the minimum score is found to be 0 and maximum score is 16 with mean 5.05 and standard deviation 3.156, for oral control the minimum score is found to be 0 and maximum score is found to be 15 with mean 5.48

and standard deviation 2.910 and for eating attitude the minimum score is found to be 0 and maximum score is found to be 43 with mean 19.41 and standard deviation 8.8022. From the table it can be interpreted that there is a maximum score for dieting and minimum score for oral control and the mean is highest in case of dieting. So the researcher is of the opinion that are of a habit of dieting in comparison to oral control and less are related to bulimia food preoccupation.

**Table 3:** Mean change in eating attitude of students according to their BMI

BMI Level	N	Mean	SD		Sum of Squares	df	Mean Square	F	p-value
Underweight	10	15.60	5.06	Between Groups	14540.57	4	3635.14	74.600	0.000 <sup>S</sup>
Normal weight	306	15.66	4.81						
Overweight	113	22.96	11.42	Within Groups	24120.55	495	48.72		
Obese Grade I	67	30.42	5.67						
Obese Grade II	4	31.25	4.50	Total	38661.12	499			

cS - Significant(p<0.001)

Table 3 depicts that out of 500 respondents 10 are found to be with mean 15.60, 306 are found to be with mean 15.66, 113

are found to be with mean 22.96, 67 are found to be with mean 30.42 and 4 are found to be with mean 31.25. The value

of ANOVA is found to be 74.6 which is significant at 5% level of significance, this shows that there is a significant

difference in eating attitude of students according to BMI.

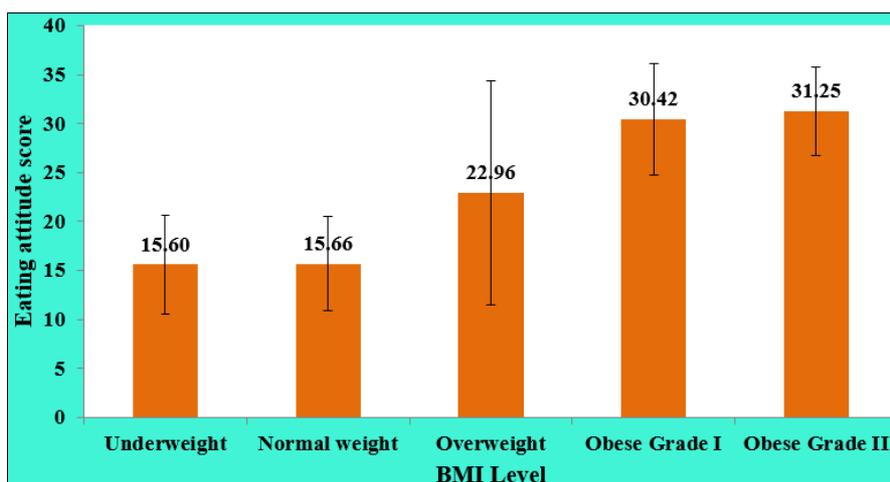


Fig 1: Shows the eating attitude score

The figure -1 presents the mean values related to change in eating attitude in student according to BMI which clearly shows that the highest mean value is in the case of obese II and least mean value is in the case of underweight.

significant difference does not appear, whereas in middle levels of BMI criteria significant difference seems to be appear.

Table 4: Paired mean difference of eating attitude score according to BMI level of students

BMI Level	Mean difference	Std. Error	p-value
Underweight vs. Normal weight	-0.063	2.243	1.000 <sup>NS</sup>
Underweight vs. Overweight	-7.356	2.303	0.038 <sup>S</sup>
Underweight vs. Obese I	-14.818	2.366	0.000 <sup>S</sup>
Underweight vs. Obese II	-15.650	4.130	0.007 <sup>S</sup>
Normal weight vs. Overweight	-7.292	0.768	0.000 <sup>S</sup>
Normal weight vs. Obese I	-14.755	0.942	0.000 <sup>S</sup>
Normal weight vs. Obese II	-15.587	3.513	0.001 <sup>S</sup>
Overweight vs. Obese I	-7.462	1.076	0.000 <sup>S</sup>
Overweight vs. Obese II	-8.294	3.552	0.245 <sup>NS</sup>
Obese I vs. Obese II	-.832	3.593	1.000 <sup>NS</sup>

NS - Non Significant ( $p \geq 0.05$ ) S – Significant ( $p < 0.05$ )

Table 4 depicts the significant differences between various BMI levels which is calculated by using paired T-test. Out of total 10 different parameters it has been found that 7 are resulted in significant differences whereas only 3 are found to be non- significant at 5% level of significance. The table interpret that there were non- significant differences between under-weight and normal weight, overweight and obese II and between obese I and obese II. The researcher further analysed that during early levels and last levels of BMI category, the

Homogeneous Subsets

Table 5: Item 26\_Score Schaffer

BMI Asian	N	Subset for alpha = 0.05	
		1	2
Underweight (<18.5)	10	15.60	
Normal weight (18.5 - 22.9)	306	15.66	
Overweight (23.0 - 24.9)	113	22.96	22.96
Obese I (25.0 - 29.9)	67		30.42
Obese II (>=30.0)	4		31.25
Sig.		.120	.054

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 13.261.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

The above table displays means for groups in homogenous subsets. While grouping all the BMI levels into two subsets which include underweight, normal weight and overweight in subset 1 and overweight, obese I and obese II in subset 2. The researcher tries to find out the significant differences in these subsets. The table depicts that there is no significant difference between two subsets.

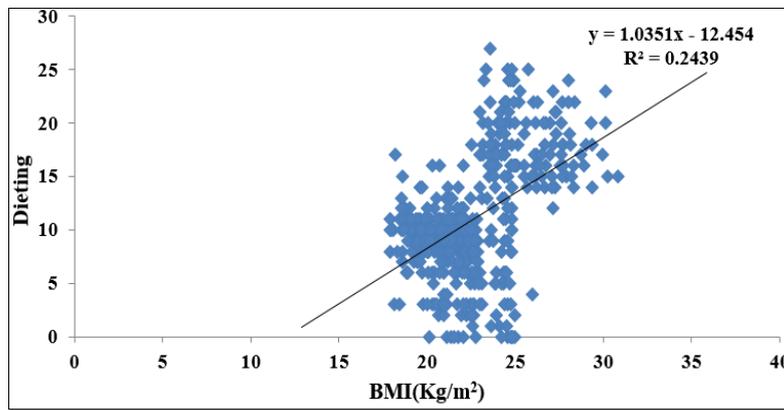
Table 6: Coefficient of correlation

	BMI	Dieting	Bulimia Food Preoccupation	Oral Control	Eating Attitude
BMI	-				
Dieting	0.494**	-			
Bulimia Food Preoccupation	0.447**	0.626**	-		
Oral Control	0.432**	0.610**	0.471**	-	
Eating Attitude	0.513**	0.887**	0.800**	0.748**	-

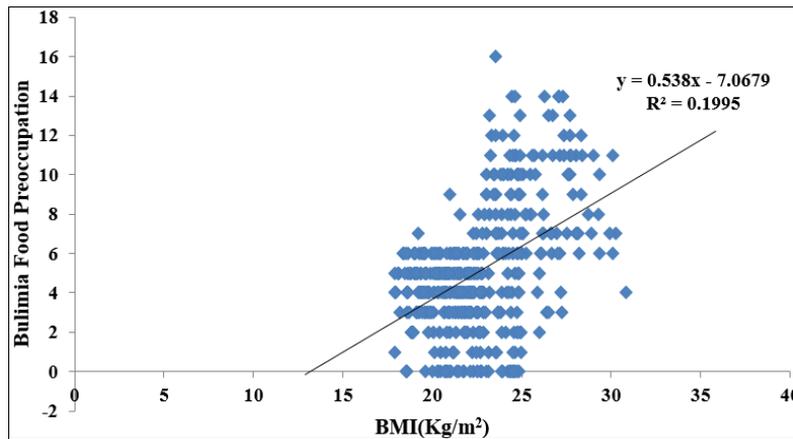
\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table-6 depicts the correlation between the different factors related to BMI level. It has been found that there is a significant correlation in all factors with BMI as well as between themselves at 1% level of significance. The highest

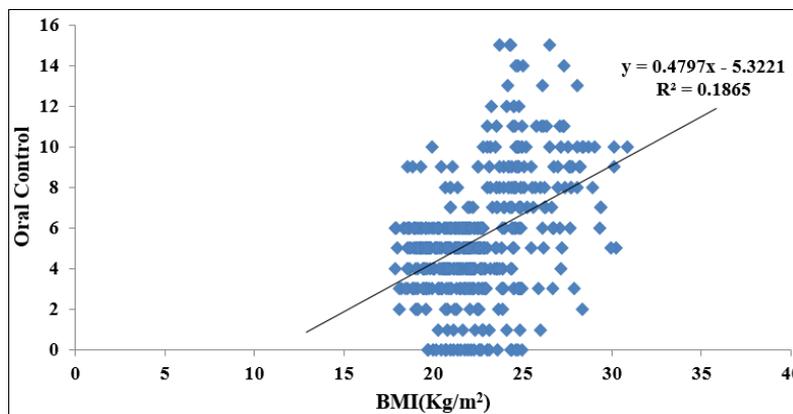
correlation is found to be between eating attitude and dieting whereas the lowest correlation is found to be between oral control and BMI



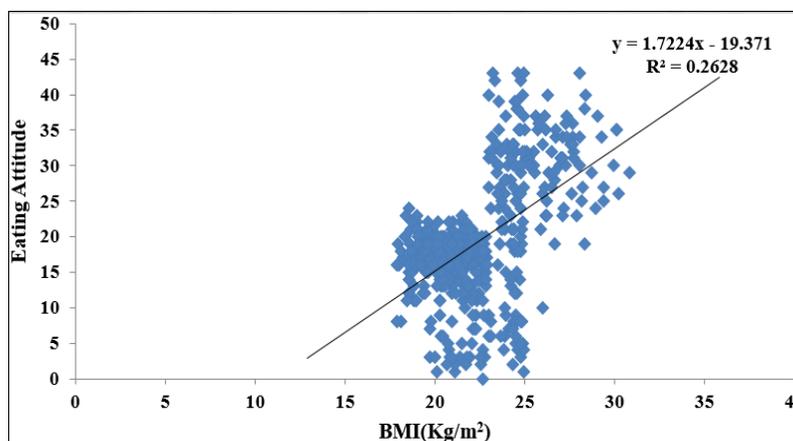
**Fig 2:** Depicts the regression equations for dieting with BMI



**Fig 3:** Depicts the regression equations for bulimia food preoccupation with BMI



**Fig 4:** Depicts the regression equations for oral control with BMI



**Fig 5:** depicts the regression equations for eating attitude with BMI

The above graphs depicts the regression equations for dieting with BMI, bulimia food preoccupation with BMI, oral control with BMI and eating attitude with BMI. Here BMI is taken as dependent variable and dieting, bulimia food preoccupation, oral control and eating attitude are taken as independent variables. The coefficient of determination is found to be 0.2439 between dieting and BMI, 0.1995 between bulimia

food preoccupation and BMI, 0.1865 between oral control and BMI and 0.2628 between eating attitude and BMI. So we can say that 24.39% change in BMI is resulted because of dieting, 19.95% change in BMI is because of bulimia food preoccupation, 18.65% change in BMI is because of oral control, 26.28% change in BMI is because of eating attitude.

**Table 7: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.545 <sup>a</sup>	.297	.291	2.20603	.297	52.184	4	495	.000

a. Predictors: (Constant), Item26\_Score, Oral Control, Bulimia Food Preoccupation, Dieting

**Table 8: Anova<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1					
Regression	1015.822	4	253.955	52.184	.000 <sup>b</sup>
Residual	2408.959	495	4.867		
Total	3424.781	499			

a. Dependent Variable: BMI

b. Predictors: (Constant), Item26 Score, Oral Control, Bulimia Food Preoccupation, Dieting

The above table depicts the ANOVA analysis for the variables under study. The value of F- statistics is found to be significant at 5% level of significance, so we can say that

there is a significant difference between the various variables under study.

**Table 9: Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	19.511	0.242		80.544	0.000	19.035	19.987
Dieting	0.163	0.043	0.342	3.808	0.000	0.079	0.247
Bulimia Food Preoccupation	0.216	0.060	0.261	3.631	0.000	0.099	0.333
Oral Control	0.204	0.057	0.226	3.606	0.000	0.093	0.315
Item26_Score	-0.050	0.043	-0.169	-1.159	0.297	-0.135	0.035

Dependent Variable: BMI

The above table is interpreting that all the domains dieting, bulimia preoccupation and oral control had significant effect on BMI and combined effect of eating attitude is 29% (R<sup>2</sup> = 0.297)

Organization; c2013. Dec 2.

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