Eating Behaviours, Nutritional Status, and Body Composition Among Nutritional College Students in Indonesia Metropolitan Cities

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Abstract: There are major changes in youth such as changes in physical, psychological and social orientation that affect eating behavior. Better nutrition knowledge may lead to positive attitude about eating behavior and forming proper eating behavior that can impact to nutritional status and body composition. This study used cross sectional design. The population of this study was nutrition college students in Indonesia metropolitan cities. Eating behavior was assessed using The Dutch Eating Behavior Questionnaire (DEBQ) (S. It consisted of three subscales: restrained, emotional, and external eating behavior. Body composition was measured with bioelectrical impedance analysis (BIA) Omron Karada Scan. The overweight and obese prevalence were 13.2% and 22.9% respectively. The major dominant eating behavior among subjects was external eating. BMI and some body fatness indicator had negative correlation with external eating and positive correlation with restrained eating. Skeletal muscle had negative correlation with restrained eating and positive correlation with external eating.

1 INTRODUCTION

Since 1975 to 2016, worldwide prevalence of obesity had nearly tripled. In Indonesia the prevalence of obesity had increased from 15.4% in 2013 to 21.8% in 2018 (WHO, 2021). The age of 19-24 years was the starting point for the increase in the prevalence of obesity before continuing to increase in adulthood until it reaches a peak at the age of 40-44 years. Jakarta as one of Indonesia metropolitan cities was on 2nd rank highest obesity prevalence in Indonesia (Indonesia Ministry of Health, 2019).

Overweight and obesity youth have higher risk for developing metabolic syndrome. Obesity and adiposity can be reflected from BMI and body composition such as body fatness. Higher percentage of body fat tend to increase risk of metabolic syndrome among adolescent (Devy, 2018).

Many factors correlate with obesity. Nutritional intake is one of the direct factors of obesity. Higher nutritional intake especially macronutrient beyond the nutritional requirement and energy expenditure increase risk of obesity (Jaeger, 2022). Eating behavior affects nutritional intake.

There are major changes in youth such as changes in physical, psychological and social orientation that affect eating behavior. They often eat not to meet their nutritional needs but for pleasure or vice versa, for some reason they avoid or reduce food intake. A study on Chilean young adults showed that emotional eating and cognitive restraint had significant relationship with higher BMI and body fatness (Pacheco *et al.*, 2021).

Nutritional knowledge is factor that related with eating behavior in youth. Better nutrition knowledge may lead to positive attitude about eating behavior and forming proper eating behavior. Nutrition college students should have better nutritional knowledge. A study of health college students in Indonesia showed that there was a significant relationship between nutritional knowledge and eating habits (Djide & Pebriani, 2023). So, this study aimed to analyse correlation between eating behavior, nutritional status, and body composition among nutritional college students in Indonesia metropolitan cities.

2 METHOD

2.1 Study Design and Population

This study used cross sectional design. The primary

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data was collected once a time. The population of this study was nutrition college students in Indonesia metropolitan cities. The inclusion criteria were 1) live in Jabodetabek agglomeration area (Jakarta, Bogor, Depok, Tangerang, and Bekasi); 2) Not in any low energy, high energy, vegetarian diet, or ketogenic diet. This research used purposive sampling technique. 83 subjects were included.

2.2 Measures

2.2.1 Eating Behavior

Eating behavior was assessed using The Dutch Eating Behavior Questionnaire (DEBQ) (Strien *et al.*, 1986). It consisted of three subscales: restrained, emotional, and external eating behavior. There are 10, 13, and 10 questions for restrained, emotional, and external eating behavior respectively. The answer was scored 1-5 as follows: never = 1, seldom = 2, sometimes = 3, often = 4, very often = 5. Each subject was cateogorized experiencing restrained, emotional, and external eating if had score more than 50% of total score for each subscale. The dominant eating behavior was obtained from the highest score among three subscales.

2.2.2 Nutritional Status and Body Composition

Body Mass Index (BMI) was used as indicator of nutritional status. BMI was calculated by formula: body weight (kg)/square of body height (m). BMI was categorized into: underweight (BMI < 18.5), normal (BMI = 18.5-24.9), overweight (BMI = 25-26.9), and obese (BMI ≥ 27). Body composition indicators used in this study were percentage of total body fat, visceral fat, total subcutaneous fat, trunk subcutaneous fat, total skeletal muscle, and trunk muscle. Body composition was measured with bioelectrical impedance analysis (BIA) Omron Karada Scan.

2.2.3 Data Analyses

Data was analysed using Statistical Package for Social Sciences (SPSS) version 22. In descriptive analysis the data was performed as mean (SD) for normally distributed data and median (interquartile range/IQR) for skewed data. Prevalence or proportion of categorized variable was performed as n (%). Bivariate analysis between eating behavior with nutritional status and body composition used Pearson correlation test for normally distributed data and Spearman correlation test for skewed data. Analysis of the differences DEBQ question item between low-normal BMI and high BMI subjects used independent t-test. Low-normal subjects were referred to underweight and normal BMI subjects. High BMI normal subjects were referred to overweight dan obese subjects.

3 RESULT

The median age of subjects was 19 years old. Most of subjects were female (96.4%) and stay with their family in family house. The majority of subjects lived in South Jakarta. The overweight and obese prevalence were 13.2% and 22.9% respectively. Cut off point for normal total body fat is < 30% for female and < 25% for male. The mean value of total body fat showed that there were many female subjects who had normal body fat. The same result was showed by visceral fat variable. The mean value of visceral fat was lower than cut off for high visceral fat. So, many subjects had normal visceral fat. The mean value of restrained, emotional, and external eating was not much different although there were more questions to assess emotional eating (13) than restrained and external eating (10) (Table 1).

Table 1: Descriptive characteristics of subjects.

Characteristics	Mean (SD), median (IQR), or n (%)
Age	19 (1)
Sex	
Male	3 (3.6%)
Female	80 (96.4%)
Domicile Status	
Boarding house	21 (25.3%)
Family house	62 (74.7%)
Nutritional Status (BMI)	21.8 (8)
Underweight	16 (19.3%)
Normal	37 (44.6%)
Overweight	11 (13.2%)
Obese	19 (22.9%)
Total body fat (%)	28.9 (6.2)
Visceral fat (%)	3 (6)
Total subcutaneous fat (%)	24.3 (6.3)
Trunk subcutaneous fat	20.7 (5.9)
Total skeletal muscle (%)	26 (4)
Trunk muscle (%)	20.9 (3)
Restrained eating	29.2 (7.6)
Emotional eating	28.9 (8.8)
External eating	29.8 (5.3)

Subjects categorized experienced restrained, emotional, and external eating if subjects had score

more than 50% of total score for each subscale. More than half of subjects experienced restrained eating (59%) and external eating (81.9%) but less frequent of subjects who had experienced emotional eating (38.6%).

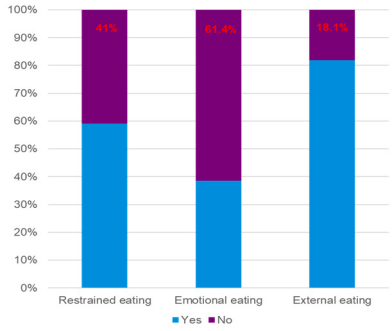

Figure 1: Proportions of subjects who experienced restrained, emotional, and external eating.

The descriptive of DEBQ question item based on nutritional status showed in Table 2. The highest score on the restrained eating subscale indicated that subjects exactly watched what they ate. Subjects with low-normal BMI were significantly more likely to look at what they ate than subjects with high BMI. However, almost for all the other question items on the restrained eating subscale indicated that subjects with high BMI were significantly more likely to did restrained eating item. Different things are found on the emotional eating subscale. A significant difference between subjects with high BMI and low-normal BMI was only found in one question item. Low-normal BMI subjects significantly had more desire to eat when nothing to do than high BMI subjects. Emotional eating behavior that's most frequent carried out by subjects was desire to eat when bored or restless. Meanwhile, the external eating behavior that's most frequent carried out by subjects was eat more usual if food taste good. Compare to high BMI subjects, low-normal BMI subjects were significantly more often to eat more than usual if food taste good. They also ate their delicious food straight away more frequently than high BMI subjects.

The dominant eating behavior for each subject was obtained from the highest score among subscale (restrained, emotional, or external eating). The major dominant eating behavior among subjects was external eating (Figure 2).

Table 2: The differences DEBQ question item based on nutritional status.

Question Items	Nutritional Status		Total	P
	Low-Normal BMI	High BMI		
Restrained eating				
When you have put on weight, do you eat less than you usually do?	2.66 (1.1)	3.4 (0.8)	2.93 (1.1)	0.009
Do you try to eat less at mealtimes than you would like to eat?	2.72 (1.0)	3.53 (0.8)	3.01 (1.0)	0.000
How often do you refuse food or drink offered because you are concerned about your weight?	2.06 (1.0)	2.93 (1.0)	2.37 (1.1)	0.000
Do you watch exactly what you eat?	3.34 (0.9)	2.80 (1.2)	3.14 (1.0)	0.032
Do you deliberately eat foods that are slimming?	1.60 (0.9)	2.24 (1.1)	1.83 (1.0)	0.003
When you have eaten too much, do you eat less than usual the following day?	2.58 (1.2)	3.07 (1.0)	2.76 (1.2)	0.056
Do you deliberately eat less in order not to become heavier?	2.53 (1.3)	3.2 (1.1)	2.77 (1.2)	0.008
How often do you try not to eat between meals because you are watching your weight?	1.94 (1.1)	2.7 (1.0)	2.22 (1.1)	0.001
How often in the evenings do you try not to eat because you are watching your weight?	2.21` (1.2)	3.23 (1.0)	2.58 (1.2)	0.000
Do you take into account your weight with what you eat?	2.87 (1.2)	3.2 (1.1)	3 (1.2)	0.158
Emotional eating				
Do you have the desire to eat when you are irritated?	2.76 (1.3)	2.37 (1.1)	2.61 (1.3)	0.200
Do you have the desire to eat when you are discouraged?	2.28 (1.1)	2.5 (1.2)	2.36 (1.2)	0.456
Do you have the desire to eat when you have nothing to do?	3.28 (1.2)	2.77 (1.2)	3.10 (1.2)	0.049
Do you have the desire to eat when you are feeling lonely?	2.81 (1.3)	2.47 (1.2)	2.69 (1.2)	0.206
Do you have the desire to eat when somebody lets you down?	1.89 (0.8)	1.9 (1.0)	1.89 (0.9)	0.800
Do you have the desire to eat when you are cross?	2.38 (1.1)	1.97 (1.1)	2.23 (1.1)	0.097
Do you have the desire to eat when you are approaching something unpleasant to happen?	1.96 (1.1)	2.0 (1.2)	1.99 (1.1)	0.976

Question Items	Nutritional Status		Total	P
	Low-Normal BMI	High BMI		
Do you have the desire to eat when you are anxious, worries, or tense?	1.38 (0.6)	1.67 (0.8)	1.48 (0.7)	0.106
Do you have the desire to eat when things are going against you or when things have gone wrong?	1.62 (0.7)	1.93 (1.0)	1.73 (0.8)	0.198
Do you have the desire to eat when you are frightened?	1.53 (0.6)	1.63 (0.8)	1.57 (0.7)	0.778
Do you have the desire to eat when you are disappointed?	1.81 (1.0)	2.07 (1.1)	1.90 (1.0)	0.314
Do you have the desire to eat when you are emotionally upset?	1.94 (1.1)	2 (1.0)	1.96 (1.1)	0.801
Do you have the desire to eat when you are bored or restless?	3.53 (1.3)	3.07 (1.2)	3.36 (1.3)	0.083
External Eating				
If food tastes good to you, do you eat more than usual?	3.94 (1.0)	3.4 (0.9)	3.75 (1.0)	0.012
If food smells and looks good, do you eat more than usual?	3.47 (1.0)	3.13 (0.8)	3.35 (0.9)	0.092
If you see or smell something delicious, do you have a desire to eat it?	3.79 (0.9)	3.5 (0.8)	3.69 (0.9)	0.118
If you have something delicious to eat, do you eat it straight away?	3.75 (1.0)	3.3 (0.9)	3.59 (1.0)	0.034
If you walk past the baker do you have the desire to buy something delicious?	3.19 (1.2)	2.7 (1.1)	3.01 (1.2)	0.059
If you walk past a snack bar or a cafe, do you have the desire to buy something delicious?	2.91 (1.2)	2.5 (1.0)	2.76 (1.2)	0.103
If you see others eating, do you also have the desire to eat?	2.6 (1.1)	2.37 (1.0)	2.52 (1.1)	0.300
Can you resist eating delicious foods?	2.32 (1.1)	2.7 (1.0)	2.46 (1.1)	0.082
Do you eat more than usual, when you see others eating?	2.13 (1.0)	2.17 (0.9)	2.14 (0.9)	0.764
When preparing a meal are you inclined to eat something?	2.43 (1.0)	2.67 (1.0)	2.52 (1.0)	0.265

Table 3: Correlation between eating behavior, nutritional status, and body composition.

Variable		Restrained eating	Emotional eating	External eating
BMI	P	0.000	0.194	0.01
	r	0.504	-0.144	-0.352
Total body fat	P	0.141	0.136	0.009
	r	0.163	0.165	-0.285
Visceral fat	P	0.000	0.113	0.001
	r	0.458	-0.175	-0.353
Total subcutaneous fat	P	0.003	0.440	0.271
	r	0.323	0.086	-0.122
Trunk subcutaneous fat	P	0.002	0.427	0.112
	r	0.335	0.088	-0.176
Total skeletal muscle	P	0.015	0.323	0.830
	r	-0.267	-0.110	-0.024
Trunk muscle	P	0.044	0.687	0.028
	r	-0.221	-0.045	0.242

The correlation between eating behavior with nutritional status, and body composition was showed by Table 3. BMI had a significant positive correlation with restrained eating and a significant negative relationship with external eating. Total body fat and visceral fat had significant negative correlation with external eating. Visceral fat, total subcutaneous fat, and trunk subcutaneous fat correlated significant positively with restrained eating. In contrast, percentage of total skeletal muscle and trunk muscle had significant negative correlation with restrained eating.

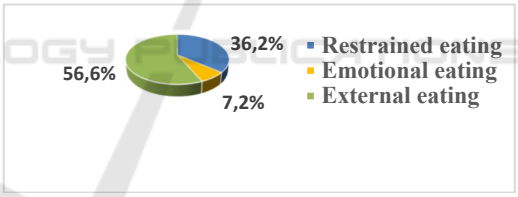

Figure 2: The dominant eating behavior.

4 DISCUSSION

The overweight prevalence in this study was slightly lower than the national overweight prevalence in Indonesia. But, obese prevalence in this study was slightly higher than the national obese prevalence in Indonesia based on Basic Health Research (Indonesia Ministry of Health, 2019).

5 CONCLUSIONS

A higher BMI –and particularly a higher fat mass and lower muscle mass - at adolescence age especially

among nutrition college students predicted less food approaching and more food avoidant behaviors

Improving nutritional knowledge is important to improve eating behavior among adolescents especially prevent emotional and external eating as well as increasing restrained eating in obesity adolescents.

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