

RELATIONSHIP BETWEEN GENDER, TRYPTOPHAN AND VITAMIN B₃ CONSUMPTION PATTERNS WITH EMOTIONAL EATING IN OVERWEIGHT ADOLESCENTS

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ABSTRACT

Emotional eating is the propensity to eat in response of negative emotions such as stress, anxiety and depression. Adolescents with overweight may experience an increase in leptin levels as well as disruption of serotonin resulting in disruption of sensitivity in regulating appetite and emotions, thereby causing emotional eating. Emotional eating can be affected by several factors including gender and fulfillment of nutrients such as tryptophan and vitamin B₃ as substances that help the production of serotonin in the body. This study aimed to examine the relationship between gender, tryptophan and vitamin B₃ consumption patterns with emotional eating in overweight adolescents. This was cross sectional study in adolescents ranges 15–18 years with overweight or obesity status in Surakarta. In total 122 adolescents taken by purposive sampling method. Emotional eating data were obtained from the Eating and Appraisal Due to Emotions and Stress (EADES) questionnaire while the consumption patterns data were obtained using Food Frequency Questionnaire (FFQ). This study that there was a relationship between tryptophan consumption pattern with emotional eating in overweight adolescents, but there was no relationship between gender and vitamin B₃ consumption pattern with emotional eating in overweight adolescents. It can be concluded that there was a relationship between Tryptophan consumption pattern with emotional eating in overweight adolescents and there was no relationship between gender and vitamin B₃ consumption pattern with emotional eating in overweight adolescents.

Keywords: Emotional eating, Tryptophan, Vitamin B₃, Adolescents, Overweight

INTRODUCTION

Physiology, emotion, sexual, neurology and behavior change rapidly in adolescents, so that the fulfillment of appropriate food consumption is needed to anticipate the prevalence of undesirable nutritional problems such as underweight, overweight and obesity (Lassi et al., 2017). Basic Health Research Data (2018) revealed that 9.5% adolescents aged 16–18 years are overweight and 4% are obese (Ministry of Health, 2018). This data shows an increasing number from data in 2013 that the number of overweight adolescents increases by 3.8% and obesity increases by 3.4%. Overweight and obesity experienced by adolescents may be caused by excessive eating behaviors such as emotional eating. Emotional eating is the propensity to eat in response of negative emotions such as stress, anxiety and depression (Van Strein et al., 2013).

Adolescents with higher BMI may experience an increase in leptin levels, resulting in disruption

of its sensitivity in regulating appetite and energy expenditure (Kaur, 2014). Regulation of energy balance by leptin is also influenced by serotonin (Haider et al., 2006). The production of serotonin requires several nutrients such as amino acid tryptophan, vitamin B₃ (niacin) and magnesium. A lack of these nutrients in a body can lead to decrease in serotonin causing impaired appetite control (Singh et al., 2016).

Striegel-Moore et al. (2009) stated that emotional eating is also differentiated according to gender or male and female, where females are more likely to experience overeating compared to males. Body-shape dissatisfaction is more common in females, the propensity to improve body-shape to look slimmer can increase stress. An increased stress level can lead to an increase in uncontrolled eating or called emotional eating (Mussap, 2007). Therefore, the researcher was interested to examine the relationship between gender and tryptophan and vitamin B₃ consumption patterns with emotional

eating in overweight adolescents. So that it can be used as an effort to control the increase in obesity in adolescents.

METHOD

This study employed cross-sectional design in Surakarta City, Central Java Province in February 2020. Population in this study was all adolescents ranges 15-18 years with overweight and obesity, while the sample size in this study was 122 adolescents taken using purposive sampling method. The inclusion criteria were adolescents ranges 15-18 years, residing in Surakarta, and having nutritional status of BMI/A > 1SD. The exclusion criteria in this study were suffering from infectious diseases (such as tuberculosis and diarrhea in the past month), professional athletes, taking water-soluble vitamin supplements, consuming appetite suppressants, severe mental disorders.

This study was carried out in three high schools. Respondents participated in previous studies have signed informed consent as proof of respondents' willingness to participate in this study. This study obtained ethical approval from the Health Research Ethics Committee of Sebelas Maret University (031/UN27.06.6.1/KEPK/EC/2020) and permission from the National Unity, Politics and Community Protection Agency of Surakarta City (070/0293/II/2020).

Tryptophan and Vitamin B₃ consumption patterns were obtained from interview using Food Frequency Questionnaire (FFQ) which had been validated before. The FFQ was containing foods high in tryptophan (dairy products, chocolate, beans and meat) with total 26 food items (Kauznaj-Czapli et al., 2017); and Vitamin B₃ (cereals, beans, animal products, vegetables and fruits) with total 20 food items (Slamet et al., 1987). The respondents were asked for their consumption a month ago and the results were calculated using a score based on Suhardjo (2010). The score was categorized as 50 for consuming food with tryptophan and vitamin B₃ of > 1x/day, 25 for 1x/day, 15 for 3x/week, 10 for 1-2x/week, 1 for <1x/week and 0 for not consuming food with tryptophan and vitamin B₃, then added up and categorized statistically. If the value > mean it

is categorized as often and value < mean it is categorized as rarely. Emotional eating data were obtained from interview using the Eating and Appraisal Due to Emotions and Stress (EADES) questionnaire and the results were categorized into emotional eating and non-emotional eating. Respondents' gender data were obtained through self-reported questionnaire.

Data were reviewed descriptively by looking at the frequency distribution of study results. Bivariate analysis using Chi Square test. Further, multivariate analysis was performed using a multiple linear regression test was carried out using the IBM SPSS Statistics 20 software to determine the relationship between the independent and dependent variables.

RESULT AND DISCUSSION

Based on the tests, the results were as follows Table 1.

The percentage of female respondents was 57.4%, while the percentage of male respondents

Table 1. Distribution of Gender, Tryptophan, Vitamin B₃ Consumption Patterns and Emotional Eating

Variables	Amount	
	n	%
Gender		
Male	52	42.6
Female	70	57.4
Pocket Money/ Day (IDR)		
>20,000	25	20.5
10,000–20,000	87	71.3
<10,000	10	8.2
Parental Income/ Month (IDR)		
>2,000,000	75	61.5
1,000,000-2,000,000	42	34.4
<1,000,000	5	4.1
Emotional Eating		
Emotional eating	56	45.9
Non-emotional eating	66	54.1
Tryptophan Consumption Pattern		
Rarely	69	56.6
Often	53	43.4
Vitamin B₃ Consumption Pattern		
Rarely	62	50.8
Often	60	49.2

was 42.6%. Obesity was related to mental health issues, with sex differences varying across disorders. In general, obesity was more strongly correlated with depression among women than men (Tronieri et al., 2017). Researchers have suggested that the relationship between obesity and mental health issues was stronger among women than men (Lopresti & Drummond, 2013).

Most of the subjects (71.3%) had pocket money of IDR 10,000–20,000/day. Based on parental income, more than half (61.5%) of parents earned more than IDR 2,000,000 per month. The amount of pocket money as well as family income would affect the individual ability to purchase the desired food. The higher allowance amount, the higher the purchasing power for foods (Desi et al., 2018).

The large amount of pocket money has an effect on purchasing power. However, they tend to purchase the high quantity but low quality products. For example in food choices, during transitional period, adolescents tend to choose high-calorie foods which are risk factors for overweight and obesity in adolescents (Ali & Nuryani, 2018).

As many as 45.9% of respondents experienced emotional eating. Obesity is a health problem frequently accompanied by depression and anxiety, as well as psychological eating styles such as emotional eating, addictive eating behaviors, and binge eating. In contrast to depressive disorders accompanied by loss of appetite, depression with atypical features is characterized by increased appetite that subsequently may lead to weight gain (American Psychiatric Association, 2013). Based

on food consumption pattern, we could reiterate that most of the respondents rarely eat either tryptophan or niacin food source (respectively, 56.6% and 50.8%).

Based on Table 2, it was found that tryptophan consumption pattern was associated with the prevalence of emotional eating in adolescents with p-value of 0.007.

Singh et al. (2016) explained that tryptophan is a substance that increases serotonin production in the body which functions to regulate appetite. The results of study conducted by Markus et al. (2014) stated that consumption of amino acid tryptophan could reduce the risk of increased appetite caused by stress. Lack of tryptophan-containing food consumption can also reduce mood and increase stress. Hypothalamus has the ability to produce a hormone that can control appetite, namely serotonin. Tryptophan is an important element needed by the body in the balance of serotonin, melatonin and other hormones that are important in the body's metabolism (Silva et al., 2017).

Tryptophan is obtained only through individual food intake to be metabolized in the body through several channels, namely methoxyindol and kynurenine which can then be directly used by the body in regulating hormones in the body (Kauzna-Czapli et al., 2017). The requirement of amino acid tryptophan in adolescents >12 years-adults is 11 mg/day (Yeung et al., 2003). Food with tryptophan are found in many dairy products, eggs, meat, and beans (Belitz et al., 2009). In this study, some Indonesian foods that were included in the non-quantitative Food Frequency Questionnaire (FFQ) were dairy products, chocolate, beans, meat

Table 2. Relationship between Gender, Tryptophan Consumption Pattern, Vitamin B₃ Consumption Pattern with Emotional Eating in Adolescents

Variables	Emotional Eating		Non-emotional Eating		p value
	n	%	n	%	
Gender					
Male	23	44.2	29	55.8	0.750
Female	33	47.1	37	52.9	
Tryptophan Consumption Pattern					
Rarely	39	56.5	30	43.5	0.007*
Often	17	32.1	36	67.9	
Vitamin B₃ (Niacin) Consumption Pattern					
Rarely	29	46.8	33	53.2	0.844
Often	27	45	33	55	

products such as chicken and beef as well as some fruits containing high tryptophan such as Avocado and Banana.

In this study, vitamin B₃ consumption pattern had no relationship with emotional eating in adolescents ($p=0.844$). The result was consistent with the study conducted by Dressler & Smith (2015) which showed that intake of vitamins B₃, B₆, B₉, and B₁₂ had no relationship with emotional eating caused by depression. This is because vitamin B₃ is not a direct factor that can affect the production of serotonin, vitamin B₃ functions as a co-factor or a supporting factor of tryptophan in producing serotonin (Van Streint et al., 2016). Furthermore, vitamin B₃ plays a role in reducing stress, depression and anxiety (Mitchell et al., 2014). Vitamin B is a water-soluble vitamin largely synthesized by plants and animal food products such as vegetable, fruits, seeds, meat, eggs and milk (Kennedy, 2014).

The result indicated that gender had no relationship with emotional eating, this is inconsistent with the study conducted by Camilleri et al. (2014) that cases of emotional eating accompanied by consumption of high-energy foods are more common in females than males. This is because emotional eating is not only caused by gender, but many factors such as stress levels, physical activity and the socio-economic environment. According to Tronieri et al. (2017) explained that prospective studies had not found gender to be a consistent moderator of the bidirectional relationship between obesity and mental health, gender differences in the relationship between obesity and emotional eating had not been studied as extensively as mood.

However, based on Table 2, it can be seen that the percentage of females experiencing emotional eating is higher than males. In addition, emotional eating is also affected by other factors such as stress levels and environmental influences such as playmates (Van Streint et al., 2016).

CONCLUSION

The result of this study indicated the consumption pattern of tryptophan had a negative effect on emotional eating in overweight adolescents. The more often consuming tryptophan

will further reduce emotional eating in overweight adolescents. Adolescents should be able to control their food consumption by choosing nutritious food and controlling stress.

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