

RESEARCH STUDY

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The Relationship between Fad Diet Sentiments and Body Image Perceptions with the Nutritional Status of Adolescents in Surabaya

Hubungan Sentimen Fad Diet dan Persepsi Citra Tubuh dengan Status Gizi Remaja di Surabaya

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ARTICLE INFO

Received: 23-05-2024

Accepted: 10-03-2025

Published online: 12-09-2025

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DOI:

10.20473/amnt.v9i3.2025.430-437

Available online at:

<https://e-journal.unair.ac.id/AMNT>

Keywords:

Fad diet, Sentiment, Body image, Perception, Adolescents nutrition

ABSTRACT

Background: Adolescence is an important stage of growth and development due to its ability to affect eating behaviours, which are likely to have an impact on a person's nutritional status.

Objectives: This study aims to analyze the relationship between fad diet sentiments and body image perceptions associated with the nutritional status (BMI/A or Body Mass Index-for-age) of adolescents in Senior High School of 5 Surabaya.

Methods: The research method employed a cross-sectional design with a sample size of 91 respondents selected through simple random sampling. Data collection of fad diet, body image, and nutritional status was conducted through questionnaire instruments, interviews, and anthropometric measurements. Data were analyzed using Pearson correlation and Fisher Exact's tests.

Results: The results of this study indicate that 51.6% of respondents have overweight or obesity status. 46.2% of adolescents at Senior High School of 5 Surabaya have a negative body image, with the majority feeling dissatisfied with their weight and facial appearance. Based on statistical analysis results, there is a significant relationship between fad diet sentiment ($p\text{-value} < 0.05$) and body image ($p\text{-value} < 0.05$) with nutritional status (BMI-for-age).

Conclusions: The conclusion drawn from this study is that the majority of respondents engage in fad diets by reducing meal frequency and 46.1% have negative body image perceptions.

INTRODUCTION

Adolescence is associated with the second fastest growth period after infancy and is characterized by significant changes in body composition, metabolic and hormonal functions, organ maturation, and the formation of nutrient reserves that can affect future health¹. In addition, adolescence has an important urgency to the growth and developmental stages because it can form eating behaviours that will most likely imply on an individual nutritional status². The tendency to double burden of malnutrition has been trending recently, both underweight and over nutritional problems. (overweight dan obesity). Nutritional status problems can be caused by a variety of factors, namely

social, cultural, economic, lifestyle, genetic, and psychological health conditions³. Psychological health conditions mainly relate to the presence of stress experienced by a adolescent in which adolescence is a period that promotes the occurrence of psychological, physical, and social changes³.

Lazarus (1999)⁴ explained that stress conditions are inevitable and eliminated. In the face of such stress, one tends to implement coping mechanisms to cope with the problems faced and adapt to the changes that occur. There are two types of coping mechanisms: problem-focused coping and emotion-focused coping. Adolescents in stressful conditions tend to do coping mechanisms by multiplying food that is proven to be effective in

generating comfort or called emotional eating. When reviewed from the transactional stress theory developed by Lazarus (1999)⁴, emotional eating is one of the forms of emotion-focused coping that aims to improve a person's negative emotional state. During stressful conditions, adolescents may experience dietary changes such as a decrease or increase in appetite that can affect the level of nutritional consumption so that it imply on his or her sexual status⁵.

Another psychological factor that often occurs in adolescents is body image perception. Body image is defined as a person's subjective perception of the shape and image of their body⁶. Body image can be influenced by interpersonal and intrapersonal factors⁷. Adolescents who have a negative body image perception tend to be less confident so it can imply developing inferior behaviours, such as strict diets, eating disorders, and the use of certain drugs/supplements by adolescents⁸. Some studies show that adolescents with a nutritional status have a higher tendency to have a negative body image compared to normal nutrition status adolescents⁹.

A study in Rio de Janeiro Brazil showed 17% of adolescents considered themselves as fat and around 67% of them performed action to control their weight, with 7% of them showed extreme behaviour of weight control by using diuretic, extreme fad diet, and other kind of efforts. Meanwhile 27% adolescent consider themselves as thin and many of them still trying to lowering their body weight even though they already thin and underweight. This phenomenon needs to be prevented especially because adolescents in their young age usually used high amount of energy to support the growth spurt which determined their body height in the future. If adolescents performing extreme weight control, they might experiencing side effect like anaemia, interrupted body growth, chronic energy deficiencies, mood swing, and emotional disruption¹⁰.

In achieving ideal body weight and shape, adolescents often do weight loss with fast diet methods or called fad diets. Fad diet is a popular diet pattern known as a quick weight loss alternative but not scientifically proven¹¹. When reviewed from a therapeutic point of view, a fad diet approach can be harmful and only provide benefits in the short term¹². Inadequate nutritional intake can result from consistently carried out dietary inaccuracies. Hypoglycaemia is one of the implications of metabolic processes in the body that can appear when adolescents lack nutrients in their bodies¹³. Research that explains the feelings associated with fad diet, body image, and eating disorders is still small, and is rarely done in high school adolescents who are in the period of puberty and growth. It is important to understand the connection between fad diet, body image, and eating disorders development in adolescents because it might be interrupted the growth spurt that happened during this age and by maintaining a good nutrient intake, we can prevent adolescent from nutrition problem like anaemia, malnutrition, and many more. Thus, the study aims to analyse the relationship between sentiment fad diet and body image perception with nutritional status in adolescents Senior High School of 5 Surabaya. The Senior High School 5 Surabaya was chosen as the site of study because this school is one among the

best school in Surabaya which the students are coming from diverse social and economic background so that it may reflected the general population in Surabaya in specific, and East Java as general.

METHODS

This study used an observational method with cross sectional design. Data was obtained through interviews and self-administered questionnaires. The study was conducted at Senior High School of 5 Surabaya in May 2022. The population of this study were all students of classes X and XI with a total of 637 people, of which 343 people are class X and 294 are class XI. The sample consists both classes X and XI who have been selected by proportional random sampling according to the large calculation of the samples obtained, namely 91 samples.

The independent variables in this study include sentimental fad diet and body image, while the dependent variable was nutritional status Z score (BMI/A or Body Mass Index for Age Z score). Fad diet data was obtained through the completion of a questionnaire^{14,15} based on the American Dietetic Association and British Dietetic Association determination to Fad Diet comprising 9 questions consisting of 2 questions relating to diet efforts and 7 closed questions related to fad diet sentiment carried out by adolescents with the option "yes" or "no" with a score of 0 when answering "No" and 1 when responding "Yes". Furthermore, the scores obtained will be summed up with the category of having fad diet sentiment when the score is ≥ 1 , and not having fad diets when the overall answer is "no".

Body image data was obtained from the completion of the validated Multidimensional Body-Self Relations Questionnaire-Appearance Scale (MBSRQ-AS) questionnaire adapted from Cash, et al. (2004)¹⁶. The questionnaire consists of 34 multidimensional questions that represent the level of satisfaction of the body shape of the adolescents and comprises of five aspects, namely evaluation of appearance; orientation of looks; satisfaction with body parts; anxiety of becoming fat; and classification of body size. Next, the total responses of the five aspects will be summed up with the total body image category positive and body image negative according to the calculation of the ratio of scores obtained by the respondents. All questionnaire used in this study has been adopted and translated in Bahasa Indonesia, also has been tested for its validity and reliability for Indonesian population with the validity coefficient 0.3 and reliability score 0.756^{14,15}.

The nutritional status was calculated by measuring the weight and height of each child, then it will be calculated through the WHO-AnthroPlus software based on BMI/A Z score. Calculation of BMI/A categorized according to the Regulations of the Minister of Health RI No. 2 Year 2020 on Children's Anthropometry Standards based on Z-score, i.e. < -3 SD (very poor nutrition); -3 SD to < -2 SD (less nutrition); Z-score -2 SD to $+1$ SD (good nutrition); Z-score > 1 SD (obesity). All the data obtained from the calculation using WHO-AnthroPlus has been validated using Indonesia standard for BMI/A of children based on PMK (*Peraturan Menteri Kesehatan*) or Health Ministry Rules number 2 year 2020 about Children

Anthropometry Standards. Statistical analysis using STATA 14, by performing the Pearson correlation test for parametric data and Fisher exact's test for non-parametric data. This research has obtained ethical approval from the Health Research Ethics Commission of Airlangga University Dental Faculty with certificate no. 483/HRECC.FODM/V/2023 on May 15th 2023.

RESULTS AND DISCUSSIONS

The results of the study show that Senior High School of 5 Surabaya adolescents are mostly 16 years old. The age group belongs to the late adolescence period where adolescents have undergone physical and psychosocial transformations so that they can see the situation comprehensively with their newly formed

identities¹⁷. Adolescents at this time tend to have a dynamic lifestyle and eating habits and can affect intake and nutritional needs so it is necessary to pay attention¹⁸. Based on gender, it was found that the majority of respondents were female (62.6%). Adolescent female often feel less confident about their body shape due to the presence of fat levels in the body so this implies the emergence of a negative body image¹⁹. Based on Tables 1, it can be found that 46.2% have negative body image perceptions, and there are as many as 65.9% adolescents have fad diets. This suggests that half of the respondents feel less satisfied with their body shape, as well as potentially have a tendency to do a fad diet when they want to do weight loss.

Table 1. Frequency distribution of respondents based on age, fad diet sentiment, body image, and nutritional status Body Mass Index per Age (BMI/A) Z-Score

Characteristic of Respondent	n	%
Gender		
Male	34	37.4
Female	57	62.6
Age (year)		
15	10	11.0
16	51	56.0
17	24	26.4
18	6	6.6
Body Mass Index-for-age		
<-3 SD	1	1.1
-3 SD sd <-2 SD	6	6.6
-2 SD sd +1 SD	37	40.7
+1 SD sd +2 SD	32	35.2
>+2 SD	15	16.5
Body Image		
Positive	49	53.8
Negative	42	46.2
Type Fad Diet		
Fad Diet	60	65.9
Not Fad Diet	31	34.1

Table 2. Distribution of respondents' answers based on the Multidimensional Body-Self Relations Questionnaire-Appearance Scale (MBSRQ-AS) for adolescents at Senior High School of 5 Surabaya

Question	Totally Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Totally Agree (%)
Before traveling, I always pay attention to my appearance.	3.3	8.8	26.4	27.5	34.1
I carefully choose clothes that will influence my appearance.	2.2	14.3	30.8	28.6	24.2
I have an attractive body.	5.5	17.6	40.7	27.5	8.8
I worry if I gain weight or become fat.	6.6	15.4	24.2	39.6	14.3
I like my appearance the way it is.	11.0	18.7	34.1	24.2	12.1
I always check my appearance in the mirror.	6.6	7.7	33.0	27.5	25.3
Before going out, I usually spend a lot of time looking/getting ready.	7.7	19.8	37.4	20.9	14.3
I am very aware of small changes in my weight.	6.6	25.3	22.0	30.8	15.4
Most people think that my appearance is good/handsome.	4.4	15.4	40.7	24.2	15.4
It is important for me to always look attractive.	3.3	16.5	27.5	33.0	19.8
I use several body care products.	7.7	18.7	28.6	33.0	12.1

Question	Totally Disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Totally Agree (%)
I like the way I dress.	4.4	18.7	25.3	38.5	13.2
If I feel like it's not suitable for skincare/body care, I immediately realize it.	7.7	26.4	30.8	29.7	5.5
I usually wear whatever is practical without caring about the appearance afterwards.	6.6	25.3	40.7	16.5	11.0
I like clothes that fit my body.	3.3	17.6	12.1	47.3	19.8
I don't care what other people think about my appearance.	9.9	33.0	27.5	16.5	13.2
I have special care for my hair.	6.6	30.8	34.1	22.0	6.6
I don't like/feel insecure about my body shape.	12.1	25.3	33.0	17.6	12.1
My body shape looks unattractive.	7.7	35.2	33.0	18.7	5.5
I never think about my appearance.	29.7	34.1	23.1	12.1	1.1
I always try to improve my appearance.	5.5	20.9	20.9	35.2	17.6
I am on a diet/in the process of losing weight.	17.6	33.0	24.2	17.6	7.7
I have been trying to lose weight by fasting or going on a strict diet	14.3	22.0	31.9	22.0	9.9

Table 3. Distribution of respondents' answers based on the Multidimensional Body-Self Relations Questionnaire-Appearance Scale (MBSRQ-AS) to Their Nutritional Status Perception for Adolescents at Senior High School of 5 Surabaya

Question	Severely Underweight (%)	Underweight (%)	Normal (%)	Overweight (%)	Obese (%)
I feel my weight:	3.3	15.4	26.4	42.9	12.1
According to other people's opinions, my weight:	7.7	19.8	42.9	25.3	4.4

Table 4. Distribution of respondents' answers based on the Multidimensional Body-Self Relations Questionnaire-Appearance Scale (MBSRQ-AS) to Their Body Satisfaction for adolescents at Senior High School of 5 Surabaya

Question	Very Dissatisfied (%)	Dissatisfied (%)	Neutral (%)	Satisfied (%)	Very Satisfied (%)
How satisfied are you with your facial features (face shape and color)?	9.9	34.1	26.4	25.3	4.4
How satisfied are you with the hair section?	13.2	27.5	27.5	25.3	6.6
How satisfied are you with your lower body (from hips to feet)?	13.2	29.7	35.2	19.8	2.2
How satisfied are you with your midsection (from waist to stomach)?	15.4	33.0	26.4	18.7	6.6
How satisfied are you with your upper body (chest, shoulders, arms)?	12.1	23.1	39.6	19.8	5.5
How satisfied are you with the shape and appearance of your muscles?	9.9	17.6	47.3	19.8	5.5
How satisfied are you with your weight?	11.0	31.9	33.0	18.7	5.5
How satisfied are you with your height?	11.0	28.6	35.2	18.7	6.6
How satisfied are you with the overall appearance of your body?	4.4	23.1	42.9	28.6	1.1

Table 5. Distribution of respondents' answers based on types of fad diets for adolescents a Senior High School of 5 Surabaya

Type of Fad Diets	n	%
Reducing the frequency of meals in a day (for example, no breakfast/no dinner)	45	49.5
Avoid certain foods (for example, foods containing carbohydrates, sweet foods, spicy foods) and replace them with vitamin and mineral supplements	16	17.6
Eating foods in certain combinations (for example, rice, vegetables and protein during the day, vegetables and rice at night, fruit only on the first day, vegetables and fruit the third day, etc.)	36	39.6

Type of Fad Diets	n	%
Eating one specific type of food (for example, carbohydrates only, protein only, fruit and vegetables only)	12	13.2
Going on a diet that provides rapid change (for example, losing more than 1 kg in a week or changing your body shape to become more attractive quickly)	14	15.4
Consuming drinks that are believed to eliminate fat (for example, slimming products such as shakers with certain formulas, slimming tea, fiber drinks)	6	6.6
Taking diet pills (slimming pills, fat loss pills)	0	0.0

From Table 2, it can be seen that 39.6% of respondents feel worried when there is weight gain or their body becomes fat. In addition, there are 42.9% of respondents who feel that their body shape is overweight or overweight. The results of the analysis in Table 6 show that there is a relationship between body image (p-value<0.05), and fad diet (p-value<0.05) with the

nutritional status of high school students at SMA Negeri 5 Surabaya. The nutritional status category is reduced to 3 categories, namely inadequate nutritional status (including malnutrition and undernutrition), normal nutritional status, and excess nutritional status (including overweight and obesity).

Table 6. The relationship between fad diet and body image with the nutritional status (BMI-for-age) of adolescents at Senior High School of 5 Surabaya

Variables	Nutritional Status								p-value	r value
	Underweight		Normal		Overweight		Total			
	n	%	n	%	n	%	N	%		
FAD Diet										
Yes	0	0.0	14	23.3	46	76.7	60	100	<0.001*	0.587
No	7	22.6	23	74.2	1	3.2	31	100		
Body Image										
Negative	5	11.9	22	52.4	15	35.7	42	100	0.014*	0.289
Positive	2	4.1	15	30.6	32	65.3	49	100		

*Pearson Correlation Test, significant if p-value<0.05

The results of this study indicate a relationship between fad diet and nutritional status based on BMI-for-age among adolescents at Senior High School of 5 Surabaya. Through statistical tests, it is known that the majority proportion of respondents who experience fad diet with the excess nutritional status category is 76.7%. This means, the higher the nutritional status of an adolescent, the higher the potential for them to engage in fad diets. This is in line with the study by Nurjannah & Muniroh (2019)¹⁴, which showed that the majority of respondents (70.0%) were currently or had previously attempted weight loss, and 100% of these respondents did so through fad dieting. The study by Vidianinggar, et al. (2021)¹³ also showed that 69% of female adolescent models had tried fad diets as a weight loss method. Adolescents are often influenced by societal trends, peer pressure, and media, which can lead to engagement in fad diets. These diets promise quick weight loss or health benefits but are not usually scientifically proven. This may influence more to adolescents who has higher nutritional status in order to gain the ideal normal weight, so that they are intend to practice more on the fad diets.

Based on Table 2, it can be seen that 49.5% of respondents reduce their meal frequency per day, meaning they skip breakfast or dinner. This implies that the majority of adolescents at Senior High School of 5 Surabaya have a meal frequency of <3 times per day to maintain their weight. This could imply a habit among adolescents to skip breakfast or fear of eating dinner due to fear of gaining weight. Reducing meal frequency is the easiest thing to do, especially for adolescents wanting to

lose weight. Additionally, other fad diet habits with the highest frequency include consuming specific food combinations (39.6%) and avoiding certain foods or replacing them with vitamin and mineral supplements (17.6%). This is consistent with the study by Nurjannah & Muniroh (2019)¹⁴, which explains that reducing meal frequency per day, consuming specific food combinations, and avoiding certain foods are the three main factors driving female adolescents to engage in fad diets. However, skipping breakfast among adolescents only contributes minimally to weight loss and can actually increase LDL (Low Density Lipoprotein) in the short term²⁰. Additionally, skipping dinner can lead to weight gain and overweight²¹. In the study by Vidianinggar, et al. (2021)¹³, it is explained that the most commonly practiced fad diet methods by respondents (57.6%) are consuming drinks believed to remove fat (such as slimming shakes, slimming tea, and fiber drinks) and dieting by consuming only one type of food (carbohydrates, protein only, or fruits and vegetables only), with a percentage of 55.7%.

Weight loss from fad diet methods tends to occur relatively instantly; however, most of the lost weight is not from fat mass but rather from muscle and water components, which can lead to a "yo-yo" effect²². Some famous fad diet methods include the Atkins Diet, Ketogenic Diet, Paleolithic Diet, Mediterranean Diet, Vegetarian Diet, Intermittent Fasting, Detox Diet, Dukan Diet, South Beach Diet, and Grapefruit Diet. Many of these diets gain popularity and followers by introducing trends of low-energy and low-carbohydrate intake. Fad

diets are chosen because they are believed to facilitate rapid and easy weight loss, improve appearance, and require less time to achieve results¹¹. These diets are effective in improving health to a certain extent. However, there are negative impacts when extreme weight changes occur, including increased risk of comorbidities and association with health risk factors such as heart disease, cancer, diabetes, increased LDL cholesterol, and decreased muscle mass^{11,23}. Despite the rapid weight loss in fad diets, there are several potential negative consequences for those with underlying conditions when implementing low-carbohydrate and high-protein diets, including metabolic acidosis and hypoglycemia^{24,25}.

The results of this study indicate a relationship between body image and nutritional status based on BMI-for-age among adolescents at Senior High School of 5 Surabaya. Through statistical tests, it is known that the majority proportion of respondents with negative body image in the excess nutritional status category is 35.7%. In this study, the highest perception of negative body image is related to concerns about adolescent weight gain, at 39.6%. This is also consistent with responses to the question "How satisfied are you with your current weight?" with 31.9% responding "Not Satisfied." Two other statements that were mostly negatively answered by respondents were 34.1% feeling dissatisfied with their facial appearance and 29.7% feeling dissatisfied with the lower body shape, from hips to legs. This could lead to dietary restrictions among respondents due to dissatisfaction with specific body parts, prompting them to seek various methods to achieve satisfaction with their body image perception. This is in line with the study by Pinho, et al. (2019)¹⁹, which shows a relationship between body image and nutritional status, where it is proven that adolescents with excess weight have higher levels of dissatisfaction with body image. This syndrome can be an implication of adolescent reactions to social exposure and the development of media, as well as pressure to conform to modern beauty standards, which include unrealistic thinness and masculine body ideals. For both male and female adolescents, body dissatisfaction correlates with Body Mass Index (BMI), meaning the higher the BMI someone has, the higher the negative perception of their body image⁸. Limitation of this study is the author cannot control other factors that can be act as confounding and influence respondents, such as friends influences, parental factors, or mental condition, thus allowing bias in the study.

CONCLUSIONS

The majority of students at Senior High School of 5 Surabaya are classified as excess nutritional status, and almost half of adolescents have a negative body image, with the majority feeling dissatisfied with their weight and facial appearance. Most adolescents also engage in fad diets, primarily by reducing meal frequency per day. There is a relationship between emotional eating, body image, as well as fad diet with the nutritional status of high school students at Senior High School of 5 Surabaya. Therefore, adolescents are encouraged to increase meal frequency according to balanced nutrition, i.e., 3 times a day with portion sizes appropriate to their plate, and to

regularly monitor their weight. Additionally, support from parents and schools is expected to provide entertainment education-based education regarding body image perceptions and the importance of engaging in physical activities to maintain an ideal body posture.

ACKNOWLEDGEMENT

Authors would like to thank Senior High School of 5 Surabaya for the help to regulate the class during study, to Universitas Airlangga to fund the study under the scheme of Riset Kolaborasi Internasional in collaboration with Universiti Teknologi Mara.

CONFLICT OF INTEREST AND FUNDING DISCLOSURE

All authors have no conflict of interest in this article. This research was funded by Universitas Airlangga under the scheme of Riset Kolaborasi Internasional number 1099/UN3.15/PT/2022.

AUTHOR CONTRIBUTIONS

AFR: validation, investigation, project administration, data curation, writing-original draft; SYA: conceptualization, methodology, writing-review, editing; DRA: conceptualization, methodology, validation, writing-review, editing, funding acquisition, investigation; ARK: validation, investigation, project administration, visualization; SAP: validation, investigation, project administration, visualization; MAW: data curation, writing-review, editing; NMN: conceptualization, methodology, validation, funding acquisition; NSM: conceptualization, methodology, validation, funding acquisition.

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