Energy intake, body image, physical activity and nutritional status of teenagers

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Abstract

The physical appearance of an individual is important for teenagers. An assessment known as “body image,” is a feeling of satisfaction or dissatisfaction with the state of the body and its appearance. The study aimed to analyze body image, energy adequacy, physical activity, and nutritional status. A total of 95 students of Sport Science at the State University of Surabaya were examined in this research using observational analytic and a cross sectional study design. Anthropometric measurements include evaluating body weight and height, examining the consumption pattern data using the 2x24 hour recall method and food frequency questionnaire. Furthermore, it analyzes the physical activity using the International Physical Activity Questionnaire method, and determines body image using questionnaires. Energy adequacy is calculated by comparing the average energy consumption with Recommended Dietary Allowances, while the nutritional status is measured using the Body Mass Index. Similarly, the relationships between variables were analyzed using the Spearman Rank Correlation Test. The results showed that there was a significant relationship between energy intake, adequacy, body image, and nutritional status.

Introduction

Adolescence is a transition period within the lifespan of all humans, which is marked by major physical, emotional and psychological changes. The criteria possessed by adolescents are inseparable from the values or social norms that exist. Each individual has an ideal self-image of what they require including body shape. Mismatch between the body shape and perceived by an individual leads to dissatisfaction. Body image is a mental representation of the shape and size of the human body, which is influenced by biological, historical, sociocultural and individual factors. Its individual level of

satisfaction is depicted by the overall acceptable physical appearance. The deep gap between the body perceived by the individual and the ideal body leads to a negative assessment.

The greater the discrepancy, the lower the assessment achieved. However, people with positive assessment make adequate use of their bodies. There are many consequences related to negative body image for instance, teenagers try to maintain their appearance by regulating their eating habits, but ignoring nutritional and health rules which influences their eating behavior.¹ Furthermore, they start to eat fewer calories to avoid being obese or overweight. Conversely, an unhealthy lifestyle and also a lack of awareness of health leads majority of them into eating excessively, which leads to obesity.²

Materials and Methods

Research design and samples

This research is an observational analytic with cross sectional study design. The sample consists of 95 male students of Sports Science at the State University of Surabaya selected using the simple random sampling technique.

Data collection and measurement

Data measurement included anthropometry which is used to determine the weight and height, consumption pattern with 2x24 hour recall method and food frequency questionnaire. Furthermore, physical activities were collected using the IPAQ (International Physical Activity Questionnaire) method, while body image was taken using a questionnaire. The level of energy adequacy was calculated by comparing the average energy consumed with Recommended Dietary Allowances. Nutritional status was measured using the Body Mass Index (BMI) with the formula weight (kg)/height(m)².

Data analysis

Spearman Rank Correlation Test was used to analyze the relationships between variables by SPSS version 22.0.

Results

The results showed participants characteristics and the relationship between the explanatory variables and nutritional status (Tables 1 and 2).

Table 1 shows participants food consumption rate which is an average of

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2780.53 ± 278.42 kcal with an energy adequacy level of 84.21%. Most participants had physical activity in the moderate category (63.16%), positive body image (74.74%), and normal nutritional status (89.47%).

Table 2 shows a significant relationship (<0.05) and positive values between energy intake, adequacy, body image and physical activity with nutritional status.

Discussion

Teenagers develops a sense of

independence and identity, while at the same time they develop more reasoning skills and a stronger sense of being self, they define their own identities, good and bad self-image or body image. Health care professionals should be aware of implementing teenagers' assessment as an evaluation of teenagers' health status.³ The awareness of body image among adolescents is very strong, especially in those experiencing puberty. At this stage, they experience hormonal changes physically, sexually and emotionally. Physical changes are the most easily seen by teens and other people.⁴

Presently, personal physical images are a means to gain access to various places in a real or virtual social environment. Efforts are made by both men and women to maintain their body appearance through the use of cosmetics products, piercings and tattoos, plastic surgery, sports materials and equipment, etc. When growing up, children build pictures of themselves, which tends to develop through things around them. Poor assessments of our body causes low self-esteem and reduce self-confidence. However, media plays an important role in building positive body image of teenagers. Research shows that eating disorders contributes to building an ideal body image which in most cases results to anorexia nervosa or bulimia, the use of steroids, protein supplements and plastic surgery.

Body image

Body image represents a psychological construct with cognitive, behavioral and perceptual dimensions, including attitudes toward the body itself and image which includes multidimensional structures that represent feelings, thoughts and behaviors.^{5,6} The development of body image is a lifelong process.⁷ Rapid physical changes that occur along with maturity in puberty have important effects on body image. Factors that influence its development in adolescents include rapid growth and development, sexual maturity, and formation of identity.⁸ During this period, teens develop a picture of what is seen on their bodies, with anxiety.⁹

It is influenced by family, friends and culture, as no one is born with a negative body image. Children's experiences are shaped by different messages in the society.¹⁰ Positive or negative information during childhood and adolescence also affects adults.¹¹ Furthermore, socio-cultural factors that involve peers and media influence such as ethnicity, social status, culture, family, school conditions, norms and peer pressure will also shape the body image.¹² However, the most influential are

family, peers and the media.¹³ Social learning and first life experiences are very important, such as the role of the family, interactions between peers, the effects of the media and negative experiences such as bullying.¹⁴

Many studies focus on the body image of women who desire to be thinner and while ignoring men.¹⁵ However others^{16,17} have stated that men also have body image problems. This research indicates that men may differ from women in their perceptions of overall body composition, shape and specific attention to other areas.^{15,18} Men itch for muscles especially in regions above the waist, while majority of women want to lose fat from the waist down such as the hips, thighs and buttocks.¹⁹

Cristiana²⁰ study showed a significant correlation between body image perception and self-esteem, mediated by weight and fat deposits. The results indicated that there is a statistically significant correlation between body mass index (BMI) and dissatisfaction ($r(158) = 0.56, p < 0.0005$), with a 79% prevalence in young women. Approximately, 87.7% of subjects had a normal and thin BMI category, while majority (66%) wanted to lose weight. There is a significant negative correlation between body image dissatisfaction and self-esteem

as the higher the dissatisfaction, the lower the self-esteem. This is illustrated with $r(158) = 0.56, p < 0.0005$ and a significant correlation between perceptions of health and self-esteem ($r = 0.36; p < 0.005$). Integrating Physical and Health Education in strategies to prevent overweight will have an effect in reducing the occurrence of physical and emotional disorders.²¹

Physical activity

Physical activity includes all involves all kinds of body movements such as play, work, active transportation, homework, sports, and recreational activities. Formal physical activity is a planned, structured, repetitive, and aims to improve or maintain one or more components of physical fitness, create a balance between energy intake and expenditure. Physical activity is one way to improve health during adolescence and its amount is dependent not only on gender, but also on body image. Teenage boys with negative body images will be less physically active. The challenge in health promotion is to maintain a relatively good perception of their body image while promoting physical activity. Prevention programs must target the promotion of a healthy lifestyle for all teenagers, both women and men.

Physical activity and exercise con-

Table 1. Variables of the participant's characteristics.

Variables	Category	Amount	Percentage (%)
Energy Intake	2000 – 2499 kcal	12	12.63
	2500 – 2999 kcal	63	66.32
	3000 – 3499 kcal	20	21.05
	Minimum:	2200	
	Maximum:	3350	
	Mean:	2780.53	
	SD:	278.42	
Energy Adequacy	Good	80	84.21
	Poor	15	15.79
Body Image	Positive	71	74.74
	Negative	24	25.26
Physical Activity	Minutes (< 600 MET-minutes a day)	23	24.21
	Moderate (600 - <1500 MET-minutes a day)	60	63.16
	High (1500 - <3000 MET-minutes a day)	12	12.63
Nutritional Status	Underweight (BMI ≤ 18.4)	8	8.42
	Normal (BMI 18.5-25)	85	89.47
	Overweight (BMI ≥ 25.1)	2	2.11

MET: Metabolic equivalents; BMI: Body Mass Index.

Table 2. The relationship between the explanatory variables and nutritional status.

Variables	Correlation Coefficient (r)	Sig.
Energy Intake	0.432	0.000
Energy Adequacy	0.276	0.007
Body Image	0.203	0.048
Physical Activity	-0.096	0.355

tribute between 25% and 50% of total daily energy expenditure and this is an important factor for weight control. There is evidence that active individuals, who are overweight/obese, possess a healthier mass and body composition compared to the inactive ones. The internet has taken a big part of our time, keeping us sitting and staring at the screen for a long time, with changes in communication, learning, and behavior patterns. Its exposure has shaped how to search and obtain information, learn and interact socially. In a short time, no one will be required to memorize information anymore, as everything will be accessible in one click. People, who work, shop, pay taxes and entertain themselves online, will spend less time on transportation and have fewer interpersonal interactions. However, owing to its addiction, people are likely to experience setbacks in imagination, memory, sharpness, sedentary lifestyle, indoor life without sunlight and fresh air, consume unhealthy food, underdeveloped lungs, with the limited possibilities of physical abilities.

Physical activity is basically important for maintaining the function of life because it has been shown to have a protective role in the development of cardiovascular diseases, metabolic and skeletal disorders, as well as mental illness. Regular physical exercise will be beneficial to health. Practical interventions and scientific studies show potential positive effects for exercise and will improve physical and psychological well-being. Scientific evidence shows that exercise is positively related to changes in body image.

Factors related to nutritional status

Healthy lifestyles, good nutrition and physical activity prevent various cardiometabolic diseases, hypertension, cancer, obesity and other related ailments.²⁴ A healthy lifestyle among adolescents and young adults is associated with a number of psychosocial and behavioral protective and risk factors which increases the likelihood of involvement in risky behavior. Protective factors reduce the possibility of involvement in risky behavior by providing a positive model of social behavior, through social and individual supervision and control, and a supportive environment. Risk and protective factors exist in all social systems and individuals.²⁵ The importance of knowledge and practice of healthy lifestyles during growth is an essential way to prevent high cases of obesity. Healthy behavior needs to be emphasized at the early stages of life.²⁶ Individuals tend to further their education at the end of adolescence and early adulthood. However, various activities during college potentially

lead to eating disorders.²⁷ Some of these include physiological and psychological factors such as changes in identity and role, lack of physical activity, cafeteria food, and availability as well as ease of buying junk food.^{27,28} Healthy behaviors are formed during higher education which may have a long impact on health promotion and disease prevention.²⁹

Male students are less concerned with weight and adopt fewer strategies compared to women. Female students have been shown to have healthier habits related to alcohol consumption, nutrition and less stress, while men show higher rates of overweight and are less interested in nutritional advice or healthy activities.³⁰

Conclusions

There is a significant relationship between energy intake, adequacy level, body image, and nutritional status.

References

1. Widiyanti N, Candra A. Hubungan antara body image dan perilaku makan dengan status gizi remaja putri di SMA Theresiana Semarang (Relationship between body image and eating behavior with nutritional status young women at Teresia High School Semarang). *J. Nutr. Coll.* 2012;1:398–404.
2. Arisman. *Buku ajar ilmu gizi dalam daur kehidupan* (Nutrition science textbooks in the life cycle). Jakarta: EGC; 2010.
3. Cash TF. Cognitive-Behavioral Perspectives on Body Image. *Encyclopedia of Body Image and Human Appearance* 2012;1:187-193.
4. Santrock JW. *Adolescence* (15th Edition). New York: McGraw-Hill Education; 2014.
5. Thompson JK, Heinberg JK. The Media's Influences on Body Image Disturbance and Eating Disorders: We've Reviled Them, Now Can We Rehabilitate Them? *Journal of Social Issues* 1999;55(2):339-353.
6. Muth JL, Cash TF. Body-image attitudes: What difference does gender make? *Journal of Applied Social Psychology* 1997;27(16):1438-1452.
7. Tantleff-Dunn S, Gokee JL. Interpersonal influences on body image development. In T. F. Cash, & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.108–116). New

- York: The Guilford Press; 2002.
8. Levine MP, Smolak L. Body image development in adolescence. In T. F. Cash, & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.74– 82). New York: The Guilford Press; 2002.
9. Wright MRV. Body image satisfaction in adolescent girls and boys: A longitudinal study. *Journal of Youth and Adolescence* 1989;18:71-83.
10. Davis B. *What's real, what's ideal: Overcoming a negative body image*. New York: The Rosen Publishing Group, Inc.; 1999.
11. Sarwer DB, Wadden TA, Pertschuk MJ, et al. The psychology of cosmetic surgery: A review and reconceptualization. *Clinical Psychology Review* 1998;18(1):1-22.
12. Smolak L. Body image development in children. In T. F. Cash, & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.65-73). New York: The Guilford Press; 2002.
13. Abrams LS, Storrer CC. Sociocultural variations in the body image perceptions of urban adolescent females. *Journal of Youth and Adolescence* 2002;3:443-450.
14. Neziroğlu F, Khemlani-Patel S, Veale D. Social learning theory and cognitive behavioral models of body dysmorphic disorder. *Body Image* 2008;5:28-38.
15. Andersen A, Cohn L, Holbrook T. *Making weight: Men's conflicts with food, weight, shape, and appearance*. Carlsbad, CA: Gurze Books; 2000.
16. Drewnowski A, Yee DK. Men and body image: Are males satisfied with their body weight? *Psychosomatic Medicine* 1987;49:626–634.
17. Mishkind ME, Rodin J, Silberstein LR, et al. The embodiment of masculinity: Cultural, psychological, and behavioral dimensions. *American Behavioral Scientist* 1986;29:545–562.
18. Cohane GH, Pope HG. Body image in boys: A review of the literature. *International Journal of Eating Disorders* 2001;29:373–379.
19. McCabe MP, Ricciardelli LA. Body image and body change techniques among young adolescent boys. *European Eating Disorders Review* 2001;9:335–347.
20. Pop CL. Physical Activity, Body Image, and Subjective Well-Being. *Well-being and Quality of Life-Medical Perspective* 2017. Available from: <http://dx.doi.org/10.5772/intechopen.68333>. Accessed on: 10 May 2018.
21. Diener E, Scollon C, Lucas R. *The*

- envolving concept of subjective well-being: The multifaceted nature of happiness. *Advances in Cell Aging and Gerontology* 2003;15:187-219.
22. Peper E, Lin I-M. Increase or decrease depression: How body postures influence your energy level. *Biofeedback* 2012;40(3):125-130.
 23. Scutti S. Change Your Posture To Improve Your Mood, Memory, and 5 Other Aspects of Your Life; 2014. Available from: <http://www.medicaldaily.com/change-your-posture-improve-your-mood-memory-and-5-other-aspects-your-life-289724>. Accessed on: 10 May 2018.
 24. Mokdad AH, Marks JS, Stroup DF, et al. Actual causes of death in the United States. *JAMA* 2005;291:1238–1245.
 25. Jessor R, Turbin MS, Costa MF. Predicting developmental changes in healthy eating and regular exercise among adolescent in China and the United States: The rule of psychosocial and behavioral protection and risk. *Journal of Research on Adolescence* 2010;1–19.
 26. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. Geneva, Switzerland: World Health Organization; 2000.
 27. Compas BE, Wagner BM, Slavin LA, et al. A prospective study of life events, social support, and psychological symptomatology during the transition from high school to college. *Am J Commun Psychol* 1986;14:241–57.
 28. Levitsky DA, Halbmaier CA, Mrdjenovic G. The freshman weight gain: A model for the study of the epidemic of obesity. *Int J Obes Relat Metab Disord* 2004;28(11):1435–42.
 29. Mareno N. Wellness characteristics and health risk behaviors of young adult university students. Dissertation Abstracts International: Section B: The Sciences and Engineering 70(7–B):4089; 2010.
 30. Cluskey M, Grobe D. College weight gain and behavior transitions: Male and female differences. *J Am Diet Assoc* 2009;109(2):325–9.

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