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Association body image and nutrient intake among female adolescent in SMA Lab School Surabaya

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Abstract

Body image defined as an individual's perception, thoughts, and feelings about their physical appearance, is significantly shaped during adolescence by peers, family, romantic partners, and social media influencers. This study aimed to analyze the association between body image and macronutrient intake among female adolescents. A cross-sectional study was conducted with 116 female students aged 16-19 at SMA Lab School in Surabaya. Body image was assessed using the Body Shape Questionnaire (BSQ-34), and dietary intake was estimated using two non-consecutive 24-hour recalls calculating energy and macronutrient consumption. Although 59.3% of participants had a positive body image, the majority had inadequate energy and macronutrient intake. Inadequate consumption was prevalent across both body image groups. A significant association was found between body image and energy intake (p=0.029), as well as fat intake (p=0.001). This study establishes a significant association between body image and specific dietary components in adolescent girls. The findings highlight the critical need for health interventions that simultaneously promote balanced nutrition and a positive body image.

Keywords: Body Image; Macronutrient Intake; Female adolescent; Nutrition; Physical appearance

1. Introduction

Adolescent is a key development period of identity formation, physical maturity, cognitive and emotional changes(1). During puberty, adolescent girls have more attention to body shape, approval appearance by family, peers, and romantic relationship that can increase negative body image (2,3). As adolescent grow, the relationship between body image and eating patterns is likely to emerge (4)

Several studies reported that individuals with body image satisfaction had better dietary habits compared to those with body image dissatisfaction(5). Evidence from various countries found that a positive body image generally consumed more healthier dietary habits including higher intake of fruits and vegetables, protein rich foods, and overall balanced nutrition (6,7). Conversely, adolescence who intended to lose weight reported lower consumption soft drinks, fast food, less fruit and vegetables (8,9).

Body image is defined as subjective perception, thoughts and emotions related to their physical appearance. Body image dissatisfaction is the negative body image that cause person experienced for dieting and changing their self-image (10) . High intensity exercise, low dietary intake, vomiting and dietary pill intake are representing unhealthy coping mechanism at modifying body image(11). Meanwhile, positive body image described how person love, respect and appreciation of their body(12).

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Biophysical model, that develop by Paxton, explain that body size, self-esteem, depression, perfectionism, social influences dan interpersonal interactions lead to body image development (13). Negative body image has been associated with depression, unhealthy eating behaviours, disordered eating condition, poor self-esteem and anxiety(14) . Otherwise, positive body image is linked to emotionally stability and enhanced self-confidence (15). Research among university student revealed that one in three experiences with body image dissatisfaction. Male students tend to have low fat mass and high muscle mass, while female students commonly desiring a thin body share (16).

Individuals with negative body image often have a distorted perception of their body shape and size and may experience feelings of embarrassment and self-consciousness(17). Body dissatisfaction is defined as the gap between an individual's current body image and their desired physical appearance (18). This dissatisfaction is more prevalent among females than males, typically involving a stronger desired for lower body weight (19). Such dissatisfaction frequently leads to restrictive dieting and excessive exercise behaviours (20). Among females, elevated body weight dissatisfaction has been linked to unhealthy eating behaviours, and heightened vulnerability to disordered eating and a stronger drive for thinness (21).

Body image perception significantly influences both quantity and quality of nutrition intake affected by body image perception (22). A balanced diet contributes to maintaining physical health and mental well-being and provides protection against both malnutrition and non-communicable disease (23). A study from southeast Asian countries reported high percentage of underweight among female participants, attributed to their preference for a thin body size, which leads to lower calorie consumption, unless males who tend to aim for increased body mass and size (24).

Based on this consideration, this research was conducted to determine the association between body image and dietary intake among girl adolescent students at the senior high school "Lab-school" Universitas Negeri Surabaya.

2. Material and methods

2.1. Research Design, Population, and Sample

The research used a cross-sectional design and was conducted at SMA Lab-school UNESA 1 in Surabaya, East Java from July to September 2024. respondents were selected by purposive sampling with several required sample criteria: 1) female students in grades XI and XII aged 14-18 years, not taking hormonal drugs, and not having a history of anorexia nervosa disease. The exclusion criteria were: 1) following a strict diet, 2) having chronic diseases, and 3) having metabolic diseases. The sample size calculation was calculated using the Slovin formula which considers a 10% dropout rate. The number of participants was 116.

2.2. Instrument, Analysis of Nutrition Data and Body Image

Questionnaires consisted of sociodemographic, repeated 24-hour recall (24HR) and Body Shape Questionnaire 34 (BSQ). The sociodemographic data were obtained by direct interview included name, age, email address, handphone number, and class. Two non- consecutive 24HR (weekdays and weekend) collected dietary consumption including dietary supplement in the past 24 hours. Household portions (tablespoon, teaspoons, cup, etc.)are used to measure the amount of food consumption. The energy and macronutrient intake were compared with The Indonesian Dietary Recommendation (AKG). The results were categorized as "less" if the intake of energy and macronutrient met < 80% of the requirement, while "adequate" if the intake was 80-120% of the requirement and "excess" if the intake >120% of the requirement. Self- reported body image was obtained using BSQ 34, administered online by google form. The BSQ 34 has 34 items, scored from 0 to 6 points with the total range from 0 to 204. The BSQ 34 scores were classified negative body image (score <110) and positive body image (score $\geq$ 110)

Data were analyzed using SPSS software version 25. Sociodemographic, body image and nutrient consumption was described using descriptive statistics. Spearman and Chi square correlation test were used to analyzed the association between variables. Significance level was set as $p< 0.05$.

3. Results and discussion

This research involved 116 female students from School Lab UNESA 1 Surabaya. This research assessed body image by answering the self-administered questionnaire and multiple 24-hour dietary recall.

3.1. Body image in Adolescence

Table 1 present the characteristic of total sample by age, class and perception of body image. Based on the data collected, most participants were 17 years old (46.6%), grade XII (68%), and majoring science (64.7%). The average pocket money was Rp 22.175, with 64% of female students receiving pocket money below the mean. Based on the body image perception, most participants (59.3%) have positive body image and participants with negative a body image were 39%. Participants commonly satisfied with body weight and body shape.

Table 1 Distribution of characteristic and Body Image

Category	N	%
Age		
16	31	26.7
17	54	46.6
18	31	26.7
Class		
XI	48	41,4
XII	68	58,6
Major		
Science	75	64.7
Social	41	35.3
Pocket money		
< 22.175	75	64.7
> 22.175	41	35.3
Body image		
Negative	46	39
Positive	70	59.3
Total	116	100

According to the Table 1, mostly female students (59.3%) have positive body image. This perception influenced positive support from parents, friends and teachers which improved self-confidence and created positive image(25). Female adolescent who had positive body image tend to be satisfied with their body size and shape, whereas individual with a negative body image often experience dissatisfaction(26). Body image is influenced by various factors, including family, peers, society, media, BMI, culture, self- esteem, gender, age, marital status, weight control behavior, education level, alcohol consumption, physical activity and spirituality(27,28). High quality of these relationships is essential for healthy psychosocial development (29). Qualitative research also indicate that parents play a key factor to support in highlighting and maintaining strong emotional connections within the family, which promotes positive attitudes among adolescents (30).

The school environment also contributes to body image perception. Supportive peers through positive comments about appearance and a sense of acceptance within social group can influence how adolescents perceive their bodies (31). Despite these supportive factors, this study reported that 39 % of female student had a negative body image. A similar study conducted among junior high school students in both rural and urban areas found that many had a negative body image (32). In the Indonesian setting, prevailing culture and social norm influence adolescence's body image perception. Cultural diversity also shapes how adolescent perceive beauty and body appearance. Research in DKI Jakarta showed that the proportion of adolescent with positive and negative body image was similar. Adolescent girls are less satisfied with their bodies and a more negative body image compared to their male peers (22).

Media social plays a crucial role in shaping body image. According to the meta-analysis, body-positive content quickly enhances emotional wellbeing and body satisfaction, particularly when it emphasizes diverse representations and self-acceptance(30). However, other studies conducted in 2022 highlight the risk of media exposure. Adolescent with high media exposure of body image issues in multiple social media accounts, with a notable increase in the use of picture-based platforms like YouTube, TikTok, and Snapchat reported using laxatives and vomiting more frequently (33). Body image itself is individual's subjective perception of their own body, regardless of its actual appearance(27,34). It is a multidimensional concept involving perception, emotions, judgments, and behaviors related to one's physical appearance(35). Misperception of body image is prevalent in general population and is key component of several serious condition, including anorexia nervosa, bulimia nervosa and body dysmorphic(36,37).

3.2. Consumption Energy and Macronutrient Intake

Table 2. Presents energy and macronutrient intake that identified those inadequacies, energy and carbohydrate consumption revealed the highest levels of insufficiency (76.7% and 88.8%, respectively), whereas sufficient intake was shown more frequently for protein (22.4%) and fat (27.6%).

Table 2 Energy and Macronutrient Intake

Dietary intake	**N**	**%**
Energy consumption		
Less	89	76.7
Adequate	19	16.4
Excess	8	6.9
Protein consumption		
Less	66	56.9
Adequate	26	22.4
Excess	24	20.7
Fat consumption		
Less	69	59.5
Adequate	32	27.6
Excess	15	12.9
Carbohydrate		
Less	103	88.8
Adequate	9	7.8
Excess	4	3.4
Total	116	100

Table 3 Nutrient intake according to Recommended Daily Allowance (RDA)

Nutrient	**Mean ± SD**	**RDA**	**% RDA**
Energy (kcal)	1341.2 ± 417.4	2100	63.9%
Carbohydrate (gr)	158.6 ± 56.1	300	52.9%
Protein (gr)	53.7 ±27.5	65	82.6%
Fat (gr)	54.1 ± 21.7	70	77.3%

Based on Table 3, the average consumption of energy, protein, fat and carbohydrate were 1341.2 kcal, 53.7 gr, 54.1 gr, and 158.6 gr. Overall, female adolescents' consumption fulfilled 63.9% of RDA for energy, 82.6% for protein, 52.9% for carbohydrate, and 77.3% for fat. This study show that mostly of female student consume less energy and macronutrient. Based on the Recommended Daily Allowance (RDA), most respondents did not meet daily energy and carbohydrate, while fat and protein consumption were relatively closer to recommended intake. Based on national data, the nutritional requirement for adolescent girls aged 16-18 years are approximately 2100 kcal of energy, 65 gr of protein, 70 gr of fat, and 300 gr of carbohydrates daily(38). Meanwhile, the average intake showed that 53% of female adolescents aged 13-18 consumed less than 70% of the Recommended Dietary Allowance (RDA) (39).

In urban areas, lifestyle changes - particularly in dietary patterns. Shifting traditional diet, which was high in carbohydrate and fiber, and low in fat, to modern diet which low carbohydrates and fiber, but high in fat, leading to energy imbalance(40). Recently studied by Yulia et al. (2024) reported that adolescents living in urban areas tend to have inadequate macronutrient intake, with only 10,7 % and 8.2% meeting their energy and carbohydrate requirement(32). Similarly, research in DKI Jakarta revealed that certain areas experienced inadequate energy intake with an average consumption is 76% of recommendation (22).

According to National review by Rachmi et all (2000-2018), Indonesian Adolescent tend to consume inadequate intake of protein, fruits and vegetables, accompanied excessive intake of sodium and fast food(41). Adolescents need adequate intake in both quantity and quality, and consuming a variety of foods is essential to fulfill their nutritional requirement (42,43). In urban areas, adolescents have greater access to diverse food through fast food restaurants, supermarkets and convenience stores, which leads to higher consumption of sugar, salt and fat (44). The finding of this study align with the national and global trends that show inadequate energy intake and macronutrients among adolescents, specifically in urban areas.

In other countries with similar trends, a study among Nigerian students in Malaysia revealed that the energy consumption all the respondents did not meet requirement because the most student skip breakfast(45). Other research among vocational senior high school student in Sibolga showed that their energy intake did not meet the requirement. Energy is primary nutrition need that influence macronutrient utilization (46).

Inadequate dietary intake during adolescence can lead to increased vulnerability to illness, reduced academic performance, and decreased productivity. The long-term consequences of insufficient nutritional intake at this stage are critical, as affected physical and mental development as well as growth potential (31,47,48). Macronutrient deficiency has a direct impact on height and weight (Singh Johal & Singh, 2022). Although adolescent girls may have good knowledge about healthy nutrition, this understanding is not always in line with their dietary behaviors, which can adversely affect this growth and development(49). These findings suggest that role of school base nutrition program in promoting balanced nutrition and positive environment for health eating patterns for adolescent.

3.3. Body image and nutrition intake

Based on this finding, there are any association between energy and fat consumption and body image perception. (p=0.029; p=0.00). Among 19 respondents who had sufficient energy consumption, 73.7% respondent had a positive body image. Similarly, 81.3% of 32 respondents with sufficient fat intake also had a positive body image. Participants with both negative and positive body image were predominantly found to consume insufficient amount of energy and macronutrients. Results from this study showed that there were a significant association between body image with energy (p value = 0.029) and body image with fat consumption (p value = 0.000) in female students. Among the 19 respondent who had adequate energy intake, 14 (73.7%) respondents reported having a positive body image. Similarly for fat intake, among 32 respondents who met the adequate for fat intake, 26 (81.3%) respondents were identified as having positive body image. Otherwise, 56.5% of the 69 respondents with insufficient fat intake, 56.5% were identified as having a negative body image

Table 4 Association body image and energy and macronutrient consumption

Variable	Body image		Total	p value
	Negative n (%)	Positive n (%)		
Energy consumption				
Less	40 (44.9)	49 (55.1)	89	0.029[b]
Adequate	5 (26.3)	14 (73.7)	19	
Excess	1 (12.5)	7 (87.5)	8	
Carbohydrate consumption				
Less	44 (42.7)	59 (57.3)	103	0.062 [b]
Adequate	1 (11.1)	8 (88.9)	9	
Excess	1 (25)	3 (75)	4	
Protein consumption				
Less	34 (51.5)	32 (48.5)	66	0.07 [a]
Adequate	8 (30.8)	18 (69.2)	26	
Excess	4 (16.7)	20 (83.3)	24	
Fat consumption				
Less	39 (56.5)	30 (43.5)	69	0.00 [a]
Adequate	6 (18.8)	26 (81.3)	32	
Excess	1 (6.7)	14 (93.3)	15	

[a]chi square test; [b] spearman rank test

This finding is closely related to the current lifestyle of adolescence that is reflected in their eating habits, body image perception, and physical activity, all of which influence food and nutrition intake(40). Previous research reported that students with positive body image demonstrated healthier eating habits, with 42.2% engaging in healthy dietary behaviors, compared to only 1.1% students with negative body image (46).

Despite these finding, inadequate dietary intake among adolescents is related to multiple factors, including media exposure, meal skipping and poor dietary choices. A previous study reported that social media exposure was significantly associated with higher odd of skipping breakfast and consuming SSB (50). Increased duration of media exposure may encourage individuals to purchase food presented online or advertised. Furthermore, the purpose of food consumption nowadays is not limited to fulfil nutrition requirement, but also serve as a form of leisure, desire to enjoy the flavors, aesthetic food presentation and engage in social experience with eating out(51). Supporting this, previous study found that female tend to eat out than male, which contribute to irregular eating habits. (52).

Skipping breakfast practice among adolescent range from 7-32 % and female adolescent have found to have a 30% higher risk of irregular breakfast and 63% higher risk of skipping breakfast after three years(53). This habit increases the risk of nutrition inadequate because breakfast plays a role in daily energy balance. Therefore, even individuals with positive body image who are satisfied with their body may still experience inadequate intake due to lifestyle factors such as media exposure or skipping breakfast.

Conversely, adolescent with excess body fat who desired a slimmer body tended to restrict specific food to manage their weight. Both boys and girls reportedly reducing sweet and salty snack consumption to prevent further weight gain (54).

Other research also showed that adolescents who desired to lose weight consumed less fast food and fewer sodas than body-satisfied adolescents. In addition, adolescents who perceive themselves as overweight or desire slimmer are more likely practice weight loss reduced fatty foods and dessert, but did not increase healthy food (4). A study among 3055 Massachusetts High School students showed that adolescent consume fewer portion of fatty foods and dessert for losing their weight, but did not increase intake of fruit and vegetable (55). Similarly, high body image dissatisfaction levels are positively correlated with restrictive macronutrient intake aimed at achieving an ideal body appearance among young adults (56).

On the other hand, individual with positive body image is related to balance nutrition. Study conducted in Cirebon, Indonesia showed that adolescents with a positive body image and good energy intake are more likely to have normal nutritional status(57). In contrast for adolescents with negative body image. Maintaining a positive body image is essential for students, as it contributes significantly to their quality of life (58)

4. Conclusion

This research revealed that body image among female adolescents is shaped by various factors, including peers, school environment, family and social media. Positive support contributes to development positive body image. The study found that most female adolescent have positive body image, although they have inadequate energy and macronutrient intake compared to Recommended Daily Allowance (RDA). The inadequate intake is related to dietary restrictions cause by body image concern. Such habit may affect physical, mental and emotional development. Strengthening support system, including family and school, as well as promoting a healthy lifestyle are essential strategies to ensure positive body perception and healthy eating behavior.

Compliance with ethical standards

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Disclosure of Conflict of interest

The authors declare no conflicts of interest.

Statement of ethical approval

This study was approved by The Health Research Ethical Committee by Faculty of dental medicine, Universitas Airlangga under reference number: 0600/HRECC.FODM/VI/2024.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

[1] Papageorgiou A, Fisher C, Cross D. “Why don’t I look like her?” How Adolescent Girls View Social Media and Its Connection to Body Image. BMC Womens Health. 2022 Dec 1;22(1).

[2] Fauzania SN, Solehati T, Hidayati NO. The Description of The Body Image of Adolescent Girls during Puberty. Indonesian Journal of Global Health Research [Internet]. 2024 Apr;6(2):771–8. Available from: https://doi.org/10.37287/ijghr.v6i2.3029.

[3] Ganesan S, Ravishankar S, Ramalingam S. Are Body Image Issues Affecting our Adolescents? A cross-sectional Study among College going Adolescent Girls. Indian Journal of Community Medicine. 2018;43(5):S42–6.

[4] Bodega P, de Cos-Gandoy A, Fernández-Alvira JM, Fernández-Jiménez R, Moreno LA, Santos-Beneit G. Body Image and Dietary Habits in Adolescents: A Systematic Review. Nutr Rev. 2024 Jan 1;82(1):104–27.

[5] Balluck G, Zaynab Toorabally B, Hosenally M. Association Between Body Image Dissatisfaction and Body Mass Index, Eating Habits and Weight Control Practices among Mauritian Adolescents. Mal J Nutr. 2016;3(22):389–401.

[6] Ro Y, Hyun W. Comparative Study on Body Shape Satisfaction and Body Weight Control between Korean and Chinese Female High School Students. Nutr Res Pract. 2012 Aug;6(4):334–9.

[7] Hyun H, Lee H, Ro Y, Gray HL, Song K. Body Image, Weight Management Behavior, Nutritional Knowledge and Dietary Habits in High School Boys in Korea and China. Asia Pac J Clin Nutr. 2017;26(5):923–30.

[8] Tebar WR, Gil FCS, Scarabottolo CC, Codogno JS, Fernandes RA, Christofaro DGD. Body Size Dissatisfaction Associated with Dietary Pattern, Overweight, and Physical Activity in Adolescents: A Cross-sectional Study. Nurs Health Sci. 2020 Sep 1;22(3):749–57.

[9] Ayed H Ben, Yaich S, Jemaa M Ben, Hmdia M Ben, Trigui M, Jedidi J, et al. What are the Correlates of Body Image Distortion and Dissatisfaction among School-adolescents? Int J Adolesc Med Health. 2019 May 17;33(5).

[10] MacNeill LP, Best LA, Davis LL. The role of personality in body image dissatisfaction and disordered eating: Discrepancies between men and women. J Eat Disord. 2017 Oct 18;5(1).

[11] Frank R, Claumann GS, Felden ÉPG, Silva DAS, Pelegrini A. Body weight perception and body weight control behaviors in adolescents. J Pediatr (Rio J). 2018 Jan 1;94(1):40–7.

[12] You S, Shin K. Body Esteem among Korean Adolescent Boys and Girls. Sustainability. 2019 Apr 6;11(7):2051.

[13] Paxton SJ. Evidence, Understanding and Policy: A Perspective from Psychology – Prevention, Early Intervention and Treatment of Body Image Problems. Body Image: Evidence, Policy, Action. Report of a Multidisciplinary Academic Seminar on Behalf of the Government Equalities Office [Internet]. United Kingdom; 2003 [cited 2025 Jul 9]. Available from: https://www. gov.uk/.../uploads/.../Susan_Paxton_-_Body_Image_Seminar__3_. docx

[14] Cooley E, Toray T. Body Image and Personality Predictors of Eating Disorder Constructive Energies of The Psyche. London: Routledge. Symptoms during the College Years. International Journal of Eating Disorders. 2001;30(1):28–36.

[15] Polivy J, Herman P. Causes of Eating Disorders. Annual Reviews. 2002;53:187–213.

[16] Shahi VK, Kohli N. Body Image Attitudes and Perception among College Students. International Journal of Social Scienc. 2019;5(7):12631267.

[17] Merino M, Tornero-Aguilera JF, Rubio-Zarapuz A, Villanueva-Tobaldo CV, Martín-Rodríguez A, Clemente-Suárez VJ. Body Perceptions and Psychological Well-Being: A Review of the Impact of Social Media and Physical Measurements on Self-Esteem and Mental Health with a Focus on Body Image Satisfaction and Its Relationship with Cultural and Gender Factors. Vol. 12, Healthcare (Switzerland). Multidisciplinary Digital Publishing Institute (MDPI); 2024.

[18] Kong P, Haris LM. The Sporting Body: Body Image and Eating Disorder Symptomatology Among Female Athletes from Leanness Focused and Nonleanness Focused Sports. J Psychol . 2015;149(2):141–60.

[19] Gruszka W, Owczarek AJ, Glinianowicz M, Bąk-Sosnowska M, Chudek J, Olszanecka-Glinianowicz M. Perception of body size and Body Dissatisfaction in Adults. Sci Rep. 2022 Dec 1;12(1).

[20] Hausenblas HA, Fallon EA. Exercise and body Image: A Meta-Analysis. Psychol Health. 2006 Feb;21(1):33–47.

[21] McNulty K. Associations of Weight Dissatisfaction on Diet Quality Percent Body Fat, and Physical Activity in College Students. 2020.

[22] Gifari N, Sitoayu L, Nuzrina R, Ronitawati P, Kuswari M, Prasetyo TJ. The Association of Body Image, Percent Body Fat, Nutrient Intake, Physical Activity among Adolescent. Nutr Food Sci. 2022 Nov 15;52(8):1221–30.

[23] Smethers AD, Rolls BJ. Dietary Management of Obesity: Cornerstones of Healthy Eating Patterns. Med Clin North Am [Internet]. 2017;102. Available from: https://www.elsevier.com/open-access/userlicense/1.0/

[24] Mun CLS, Rajikan R, Yahya HM. Body Image Perception and Its Association with Food Intake among Undergraduate Students in Kuala Lumpur, Malaysia. Makara Journal of Health Research. 2022 Aug 26;26(2).

[25] Dimas Bimantara M, Adriani M, Suminar DR. Hubungan Citra Tubuh dengan Status Gizi pada Siswi di SMA Negeri 9 Surabaya The Relationship between Body Image and Nutritional Status of Female Students in Senior High School 9 Surabaya. 2019;85–8.

[26] I Gusti Ayu Komang Widiastuti, Ni Ketut Sutiari, Luh Seri Ani. Body image perception is associated with nutritional status of adolescent girls: A cross-sectional study in Denpasar City, Bali Province, Indonesia. Public Health and Preventive Medicine Archive. 2023 Dec 31;11(2):191–200.

[27] Alleva JM, Sheeran P, Webb TL, Martijn C, Miles E. A meta-analytic review of stand-alone interventions to improve body image. PLoS One. 2015 Sep 29;10(9).

[28] Jang HY, Ahn JW, Jeon MK. Factors affecting body image discordance amongst Korean adults aged 19-39 years. Osong Public Health Res Perspect. 2018;9(4):197–206.

[29] Mota CP, Matos PM. Parents, teachers and peers: Contributions to self-esteem and coping in adolescents. Anales de Psicologia. 2014;30(2):656–66.

[30] Artigues-Barberà E, Tort-Nasarre G, Pollina-Pocallet M, Ferrer Suquet Y, Ayats Pallés A, Guasch Niubó O, et al. Key factors in supporting adolescents to achieve high self-esteem and a positive body image: A qualitative community-based study. PLoS One. 2025 Feb 1;20(2 February).

[31] Marfita MP, Fitryasari R, Ni'mah L. The Relationship of Fear of Missing Out (FoMO) and Peer Social Support with the Body Image of Female Adolescent at Senior High School. Psych. Nurs J [Internet]. 2024;6(2):89–100. Available from: http://dx.doi.org/10.20473/pnj.v6.i2.63266

[32] Yulia C, Rosdiana DS, Muktiarni M, Sari DR. Reflections of well-being: navigating body image, chronic energy deficiency, and nutritional intake among urban and rural adolescents. Front Nutr. 2024;11.

[33] Sanzari CM, Gorrell S, Anderson LM, Reilly EE, Niemiec MA, Orloff NC, et al. The impact of social media use on body image and disordered eating behaviors: Content matters more than duration of exposure. Eat Behav. 2023 Apr 1;49.

[34] Shoraka H, Amirkafi A, Garrusi B. Review of body image and some of contributing factors in Iranian population. Int J Prev Med. 2019 Jan 1;10(1).

[35] von Spreckelsen P, Glashouwer KA, Bennik EC, Wessel I, De Jong PJ. Negative body image: Relationships with heightened disgust propensity, disgust sensitivity, and self-directed disgust. PLoS One. 2018 Jun 1;13(6).

[36] Gaudio S, Brooks SJ, Riva G. Nonvisual multisensory impairment of body perception in anorexia nervosa: A systematic review of neuropsychological studies. Vol. 9, PLoS ONE. Public Library of Science; 2014.

[37] Sadibolova R, Ferrè ER, Linkenauger SA, Longo MR. Distortions of perceived volume and length of body parts. Cortex. 2019 Feb 1;111:74–86.

[38] Indonesian Ministry of Health. Regulation of the minister of health of the republic of Indonesia number 28 of 2019 concerning recommended nutritional adequacy for the people of Indonesia [Internet]. 2019 [cited 2025 Oct 18]. Available from: https://peraturan.bpk.go.id/Details/138621/

[39] Widnatusifah E, Manti Battung S, Bahar B, Jafar N, Amalia M. Gambaran Asupan Zat Gizi dan Status Gizi Remaja Pengungsian Petobo Kota Palu. JGMI: The Journal of Indonesian Community Nutrition. 2020;9(1).

[40] Fatimah PS, Siregar PA. Pola Konsumsi Buah dan Sayur Dengan Kejadian Diabetes Mellitus pada Masyarakat Pesisir. Bali Health Published Journal. 2020 Jun;1(2).

[41] Rachmi CN, Jusril H, Ariawan I, Beal T, Sutrisna A. Eating behaviour of Indonesian adolescents: a systematic review of the literature. Vol. 24, Public Health Nutrition. Cambridge University Press; 2021. p. S84–97.

[42] Koca B, Arkan G. The relationship between adolescents' nutrition literacy and food habits, and affecting factors. Public Health Nutr. 2021 Mar 1;24(4):717–28.

[43] Salam RA, Das JK, Ahmed W, Irfan O, Bhutta ZA, Sheikh SS. Effects of preventive nutrition interventions among adolescents on health and nutritional status in low-and middle-income countries: A systematic review and meta-analysis. Vol. 12, Nutrients. MDPI AG; 2020.

[44] Agestika L, Ratnayani R. Snacking Habits, Strict Diet, BMI, and Body Image of Adolescents in Three Sub-Districts in Depok and Bogor. Amerta Nutrition. 2023 Mar 1;7(1):14–9.

[45] Abubakar H, Razif Bin Shahril M, Syed S, Wafa S. Weight Status, Dietary Intake and Eating Behaviour of Nigerian Postgraduate Students in UniSZA, Malaysia. Malaysian Journal of Public Health Medicine. 2016;16(3):45–51.

[46] Adinda D, Sudaryati E. Body Image and Eating Habits of Students Female Student at Vokasi Senior High School Sibolga. 2020;(2):25–33.

[47] Brinkman HJ, De Pee S, Sanogo I, Subran L, Bloem MW. High food prices and the global financial crisis have reduced access to nutritious food and worsened nutritional status and health. In: Journal of Nutrition. 2010.

[48] UNICEF. UNICEF. 2021. Programming guidance: Nutrition in middle childhood and adolescence. Newyork.

[49] Chaudhary A, Sudzina F, Mikkelsen BE. Promoting healthy eating among young people—a review of the evidence of the impact of school-based interventions. Vol. 12, Nutrients. MDPI AG; 2020. p. 1–34.

[50] Sampasa-Kanyinga H, Chaput JP, Hamilton HA. Associations between the use of social networking sites and unhealthy eating behaviours and excess body weight in adolescents. British Journal of Nutrition. 2015 Dec 14;114(11):1941–7.

[51] Adiba C, Pradigdo SF, Kartasurya MI. Association between social media exposure to food and beverages with nutrient intake of female adolescents. Kesmas. 2020;15(4):191–8.

[52] Nisak K, Hariyanto D. Food Photography dan Eating Out di Media Sosial Instagram. KANAL (JURNAL ILMU KOMUNIKASI). 2017 Sep;1(6):31–40.

[53] Hassan BK, Cunha DB, Valeria da Veiga G, Pereira RA, Sichieri R. Changes in breakfast frequency and composition during adolescence: The Adolescent Nutritional Assessment Longitudinal Study, a cohort from Brazil. PLoS One. 2018 Jul 1;13(7).

[54] Neumark-Sztainer D, Paxton SJ, Hannan PJ, Haines J, Story M. Does Body Satisfaction Matter? Five-year Longitudinal Associations between Body Satisfaction and Health Behaviors in Adolescent Females and Males. Journal of Adolescent Health. 2006 Aug;39(2):244–51.

[55] Del Mar Bibiloni M, Pich J, Pons A, Tur JA. Body Image and Eating Patterns among Adolescents. BMC Public Health [Internet]. 2013; Available from: http://www.biomedcentral.com/1471-2458/13/1104

[56] Ribeiro-Silva R de C, Fiaccone RL, Conceição-Machado MEP da, Ruiz AS, Barreto ML, Santana MLP. Body image dissatisfaction and dietary patterns according to nutritional status in adolescents. J Pediatr (Rio J). 2018 Mar 1;94(2):155–61.

[57] Kurniasih FG, Wahidin MDS, Fachrudin D. The Influence of Body Image and Energy Intake on Nutritional Status in Adolescents at SMAN 1 Cirebon City, Indonesia. GHMJ (Global Health Management Journal). 2024 Dec 12;7(4):271–8.

[58] Baceviciene M, Jankauskiene R, Balciuniene V. The role of body image, disordered eating and lifestyle on the quality of life in lithuanian university students. Int J Environ Res Public Health. 2020 Mar 1;17(5).