

Body Image Perception and Eating Behavior as Determinants of Nutritional Status Among Adolescent Girls

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ABSTRACT

Body image perception and eating-related behaviors play an important role in determining adolescents' nutritional status. This study aimed to examine the association between body image perception, eating behavior, dietary patterns, and nutritional status among adolescent girls using a cross-sectional research design. A total of 80 adolescent girls were recruited in August 2024. Data were collected using the Multidimensional Body-Self Relations Questionnaire–Appearance Scale (MBSRQ-AS) to assess body image perception, a Food Frequency Questionnaire (FFQ) to evaluate dietary patterns, and the Eating Behavior Pattern Questionnaire (EBPQ) to measure eating behavior. Nutritional status was determined using Body Mass Index (BMI). Data were analyzed using chi-square tests with contingency coefficient analysis. The results showed that negative body image perception was significantly associated with underweight nutritional status ($p=0.006$; $C=0.335$). Adolescents with healthy eating behavior were more likely to have normal nutritional status compared to those with poor eating behavior ($p=0.012$; $C=0.316$). Dietary patterns were not significantly associated with nutritional status ($p=0.108$; $C=0.229$). In conclusion, body image perception and eating behavior were significantly associated with nutritional status among adolescent girls, whereas dietary patterns showed no significant association.

Keywords: body image perception; eating behavior; dietary patterns; nutritional status; adolescent girls

INTRODUCTION

Nutritional problems, including undernutrition, overweight, and obesity, remain major global public health challenges affecting populations across all age groups. Adolescents in low- and middle-income countries are particularly vulnerable due to rapid nutritional transition and lifestyle changes occurring during this developmental period [1]. In Indonesia, data from the Basic Health Research (2018) reported that 8.7% of adolescents aged 13–15 years were undernourished, while approximately 16% were classified as overweight or obese [2]. Nutritional imbalance during adolescence is of significant concern because obesity at this stage increases the likelihood of persistent obesity in adulthood and contributes to elevated morbidity and mortality related to non-communicable diseases [3].

Adolescence represents a critical phase characterized by substantial physical, psychological, and social changes that influence health-related behaviors [1]. During puberty, hormonal and physical transformations alter body composition and appearance, shaping adolescents' perceptions of their bodies and self-image [4,5]. These developmental changes may subsequently affect behavioral responses, including eating behavior and dietary patterns, which play essential roles in determining nutritional status [6]. Consequently, adolescence constitutes a sensitive period in which psychological perception and behavioral adaptation interact to influence long-term nutritional outcomes.

Body image is defined as a multidimensional construct encompassing individuals' perceptions, attitudes, emotions, and behaviors toward their body size and appearance [1,3]. Adolescent girls are particularly susceptible to body image concerns due to strong influences from peers, family environments, media exposure, and sociocultural ideals promoting thin body standards [7,8]. Internalization of these ideals frequently results in body dissatisfaction, which has been associated with unhealthy eating behaviors such as restrictive dieting, disordered eating patterns, and psychological distress [9]. Adolescents perceiving discrepancies between their actual and ideal body shape may adopt inappropriate dietary practices that increase the risk of both undernutrition and overweight conditions [1,10].

Previous studies have demonstrated associations between negative body image perception and unhealthy eating behaviors as well as unfavorable dietary patterns [11]. Adolescents with accurate weight perception, particularly those with overweight status, are more likely to engage in healthier weight-control behaviors compared with peers who misperceive their body condition [1]. Nevertheless, evidence regarding the relationships among body image perception, eating behavior, dietary patterns, and nutritional status remains inconsistent across populations and study settings. Most previous studies have also examined these factors separately, resulting in limited evidence regarding the simultaneous contribution of body image perception and eating behavior to nutritional status among adolescent girls. Damayanti (2022) reported significant associations between dietary patterns, body image, and overweight status among adolescent girls [12], while Agustini et al. (2021) identified significant relationships between eating behavior, body image, and nutritional status [13]. In contrast, Zahirah and Wirjatmadi (2024) found no significant association between body image perception and nutritional status, suggesting contextual variability influenced by sociocultural and environmental factors [4].

Given these inconsistencies, further investigation is needed to clarify the role of body image perception and eating behavior as determinants of nutritional status among adolescent girls. This study was conducted at SMP Negeri 7 Malang, located in Kedungkandang District, one of the areas with the highest prevalence of nutritional problems, including stunting, in Malang City [14]. Furthermore, the urban environment, rapid social development, and increasing media exposure may influence adolescents' body image perception and eating behavior. Therefore, this study aimed to analyze the association between body image perception, eating behavior, and nutritional status among adolescent girls. The findings are expected to provide insight into psychological and behavioral factors associated with adolescents' nutritional status and serve as a basis for developing school-based strategies to prevent nutritional problems among adolescent girls.

METHODS

This analytical observational study employed a cross-sectional design conducted at SMP Negeri 7 Malang, Indonesia, in August 2024. The study population consisted of adolescent girls enrolled at the school during the study period. Sample size was calculated using the Slovin formula, resulting in a minimum required sample of 80 participants. Participants were selected using simple random sampling to ensure equal probability of selection. Inclusion criteria comprised female students who were actively enrolled and willing to participate in the study by providing written informed consent. Students with known acute medical conditions affecting nutritional status, or those absent during data collection were excluded from the study. Prior

to data collection, permission was obtained from the school authorities. Participation was voluntary, and all respondents were informed about the objectives and procedures of the study. Confidentiality and anonymity of participants' data were maintained throughout the research process.

The independent variables in this study were body image perception, dietary pattern, and eating behavior, while the dependent variable was nutritional status. Data on body image perception were collected using the Multidimensional Body-Self Relations Questionnaire–Appearance Scale (MBSRQ-AS). The Indonesian version of the instrument has demonstrated good validity and reliability, with a reported reliability coefficient of 0.826 [15]. The questionnaire evaluates multiple dimensions of body image, including appearance evaluation, appearance orientation, body area satisfaction, overweight preoccupation, and self-classified weight. Total scores were calculated according to standardized scoring procedures. Body image perception was categorized as positive when the total score was greater than or equal to the median value and negative when the score was below the median. Dietary pattern data were collected using a validated Food Frequency Questionnaire (FFQ) to assess habitual food consumption [16]. The FFQ included major food groups consisting of staple foods, protein sources, vegetables, fruits, and milk products. Food consumption frequency was categorized as: (1) frequent, defined as consumption ≥ 1 time per day or 4–6 times per week; (2) occasional, defined as consumption 1–3 times per week; and (3) never consumed. Scores were assigned as 2 for frequent, 1 for occasional, and 0 for never. The cumulative score represented dietary pattern quality and was classified as good if the total score was ≥ 10 and poor if < 10 . Eating behavior data were obtained using the Eating Behavior Pattern Questionnaire (EBPQ), which evaluates eating-related practices including low-fat eating, emotional eating, consumption of sweet snacks, lifestyle-related eating habits, and meal-skipping behavior [17]. The Indonesian adaptation demonstrated acceptable internal consistency with a Cronbach's alpha value of 0.681. Eating behavior was categorized as good when total scores were equal to or above the median value and poor when scores were below the median. Anthropometric measurements were conducted following standardized procedures by trained researchers. Body weight was measured using a calibrated digital scale to the nearest 0.1 kg, while height was measured using a microtoise to the nearest 0.1 cm. Body Mass Index (BMI) was calculated as weight (kg) divided by height squared (m^2). Nutritional status was classified based on BMI into underweight (< 18.5 kg/ m^2), normal (18.5–25.0 kg/ m^2), and overweight (> 25.0 kg/ m^2) according to established guidelines [18].

Data were analyzed using IBM SPSS Statistics for Windows version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize participant characteristics. Associations between body image perception, dietary pattern, eating behavior, and nutritional status were analyzed using the chi-square test. The strength of associations was evaluated using contingency coefficients. Statistical significance was determined at $p < 0.05$ with a 95% confidence level.

RESULTS

Participant characteristics and distribution of study variables

A total of 80 adolescent girls from SMP Negeri 7 Malang participated in this study. The majority of respondents were aged 14 years (53.8%), followed by 15 years (20.0%). Most participants had body weight ranging from 41–50 kg (36.3%) and height between 141–150 cm (52.5%). Based on Body Mass Index (BMI) classification, 50.0% of respondents had normal nutritional status, while 31.3% were underweight and 18.8% were overweight. Regarding the study variables, body image perception was evenly distributed between negative and positive categories (50.0% each). Good eating behavior was observed in 52.5% of respondents, whereas 47.5% demonstrated poor eating behavior. In terms of dietary pattern, 56.2% of participants were classified as having a good dietary pattern and 43.8% as poor (Table 1).

Association between body image perception, eating behavior, dietary pattern, and nutritional status

Bivariate analysis revealed a significant association between body image perception and nutritional status ($p = 0.006$; $C = 0.335$). Respondents with negative body image perception were more frequently categorized as underweight, whereas those with positive body image perception were predominantly classified as having normal nutritional status (Table 3). Eating behavior was also significantly associated with nutritional status ($p = 0.012$; $C = 0.316$). Participants with good eating behavior were more commonly observed in the normal nutritional status category compared with those exhibiting poor eating behavior. No significant association was identified between dietary pattern and nutritional status ($p = 0.108$; $C = 0.229$), although respondents with good dietary patterns were predominantly classified as having normal nutritional status.

Table 1. Characteristics of participants and distribution of study variables

Variable	Category	Frequency	Percentage
Age	12	10	12.5
	13	10	12.5
	14	43	53.8
	15	16	20.0
	16	1	1.3
Body weight (kg)	21-30	2	2.5
	31-40	21	26.3
	41-50	29	36.2
	51-60	16	20.0
	> 60	12	15.0
Height (cm)	131-140	1	1.3
	141-150	42	52.5
	151-160	34	42.5
	161-170	3	3.8
Nutritional status (BMI)	Underweight	25	31.3
	Normal	40	50.0
	Overweight	15	18.8
Body image perception	Negative	40	50.0
	Positive	40	50.0
Eating behavior	Poor	38	47.5
	Good	42	52.5
Dietary pattern	Poor	35	43.8
	Good	45	56.2

Table 3. Bivariate analysis of the association between body image perception, eating behavior, dietary pattern, and nutritional status

Variable	Category	Nutritional status (BMI)						p-value	Contingency coefficient
		Underweight		Normal		Overweight			
		Frequency	Percentage	Frequency	Percentage	Frequency	Percentage		
Body image perception	Negative	16	40	13	32.5	11	27.5	0.006*	0.335
	Positive	9	22.5	27	67.5	4	10		
Eating behavior	Poor	12	31.6	14	36.8	12	31.6	0.012*	0.316
	Good	13	31	26	61.9	3	7.1		
Dietary pattern	Poor	11	31.4	14	40	10	28.6	0.108	0.229
	Good	14	31.1	26	57.8	5	11.1		

DISCUSSION

This study investigated the association between body image perception, eating behavior, dietary patterns, and nutritional status among adolescent girls at SMP Negeri 7 Malang. The findings indicate that psychological and behavioral factors play an important role in shaping adolescent nutritional outcomes, particularly during early adolescence, a developmental period characterized by rapid physical growth, hormonal changes, and heightened sensitivity toward body appearance and social acceptance. During this stage, adolescents increasingly internalize sociocultural standards of attractiveness that influence body perception and health-related behaviors [19]. Positive body image perception supports self-acceptance and psychological well-being, whereas negative body perception may lead adolescents to evaluate their bodies against unrealistic societal ideals shaped by peers, family environment, and media exposure [20,21]. These psychosocial processes may subsequently influence eating behavior and nutritional status regulation.

The present study demonstrated a significant association between body image perception and nutritional status. Negative body image perception was identified across all nutritional status categories, including underweight, normal, and overweight adolescents. This finding aligns with previous research indicating that body dissatisfaction is not exclusively experienced by overweight individuals but may occur across diverse nutritional conditions [13,22]. Notably, a considerable proportion of adolescents with negative body image perception in this study were classified as underweight. This result challenges the commonly held assumption that body dissatisfaction predominantly affects adolescents with excessive body weight [5,23].

From a sociocultural perspective, widespread promotion of thin body ideals may contribute to dissatisfaction even among adolescents with low body weight [24]. Underweight adolescents may perceive themselves as physically inadequate or inconsistent with perceived beauty standards despite objectively low body mass [23]. Conversely, adolescents with overweight status may maintain negative body perception as motivation for weight control behaviors, including dietary restriction or increased physical activity [25,26]. Continuous exposure to media portraying extremely thin body standards may further distort self-perception, leading adolescents with normal nutritional status to misclassify their body size [27]. These findings highlight that body image perception reflects psychological interpretation rather than objective anthropometric measurement.

Body image perception is influenced by multidimensional factors, including self-evaluation, peer comparison, family attitudes, educational settings, and individual coping strategies [8]. In this study, approximately half of the respondents demonstrated positive body image perception regardless of nutritional category. Psychological constructs such as gratitude, self-acceptance, and emotional regulation may contribute to improved body appreciation and overall mental well-being, ultimately supporting healthier behavioral choices [28,29]. This suggests that strengthening psychological resilience may play an important role in adolescent nutritional interventions beyond purely dietary approaches.

Eating behavior was also significantly associated with nutritional status. Adolescents demonstrating healthy eating behavior were predominantly classified within the normal nutritional status category, supporting existing evidence that consistent and balanced eating practices contribute to optimal growth and nutritional balance during adolescence [30]. Poor eating behaviors, including irregular meal timing, frequent meal skipping, and uncontrolled snacking, have been associated with both undernutrition and overweight conditions [13,31]. Similar observations have been reported among adolescents in Cameroon, where structured eating habits and regular consumption of nutritious foods were positively linked to normal nutritional outcomes [32].

Eating behavior during adolescence is strongly shaped by habitual practices and environmental influences occurring during periods of increased nutritional demand. Rapid growth requires adequate energy and nutrient intake; therefore, inconsistent dietary behaviors may disrupt energy balance and contribute to abnormal nutritional status [33]. Consumption of energy-dense yet nutrient-poor foods combined with sedentary lifestyles has been associated with overweight conditions among adolescents [34]. However, the present study also identified adolescents with poor eating behavior who maintained normal nutritional status. This phenomenon may be explained by compensatory mechanisms such as higher metabolic rates, varying physical activity levels, or inaccurate self-reporting of dietary practices [35,36]. These findings emphasize that nutritional status results from cumulative behavioral patterns rather than isolated eating habits.

In contrast, dietary pattern showed no statistically significant association with nutritional status. This finding suggests that dietary pattern alone may not sufficiently explain variations in adolescent nutritional outcomes, which are influenced by complex interactions among biological, psychological, and sociocultural determinants [37]. Previous studies have similarly reported non-significant relationships between dietary patterns and nutritional status, highlighting the contribution of long-term lifestyle factors such as physical activity, metabolic differences, and psychosocial conditions [38]. The absence of association may also reflect relatively homogeneous dietary practices among participants, where overall food consumption patterns approached recommended intake despite suboptimal consumption of fruits and vegetables. Although short-term nutritional status may appear unaffected, inadequate intake of micronutrient-rich foods may influence long-term metabolic health and weight regulation [39]. Furthermore, the use of FFQ may introduce recall bias and social desirability bias, potentially affecting the accuracy of dietary assessment [40].

Overall, the findings of this study indicate that adolescent nutritional status is influenced by multifactorial interactions involving psychological perception and behavioral factors rather than dietary patterns alone. Body image perception and eating behavior appear to play more immediate roles in shaping nutritional outcomes among adolescent girls, highlighting the importance of integrating psychological education, body image awareness, and healthy eating behavior promotion into school-based nutrition programs. Nevertheless, this study has several limitations, including the use of a cross-sectional design that limits causal interpretation, the relatively small sample size from a single school that may affect generalizability, and the use of self-reported questionnaires that may introduce recall and social desirability bias. In addition, other potential determinants of nutritional status, such as physical activity, socioeconomic status, psychological stress, and detailed nutrient intake, were not evaluated. Therefore, future studies involving larger populations, longitudinal approaches, and more comprehensive assessments are recommended to provide a deeper understanding of factors influencing adolescent nutritional status.

CONCLUSION

This study demonstrates that body image perception and eating behavior are significant determinants of nutritional status among adolescent girls. Adolescents with positive body image perception and healthier eating behavior were more likely to have normal nutritional status, indicating the important role of psychological and behavioral factors in adolescent nutrition. These findings emphasize the need for school-based interventions focusing on positive body image development and healthy eating behavior promotion to support better nutritional outcomes among adolescent girls.

Ethical consideration, competing interest and source of funding

- All participants were informed about the study objectives prior to data collection. Participation was voluntary, informed consent was obtained from participants and their parents or guardians, and respondent confidentiality and anonymity were maintained throughout the study.

- There is no conflict of interest related to this publication.
- Source of funding is authors.

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