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Gender Differences in Body Image Perception and Nutritional Status Among Adolescents in Sangihe District, Indonesia: A Cross-Sectional Study

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Abstract

Background: Adolescents in Indonesia experience a dual burden of malnutrition. Body image perception during adolescence can contribute to unhealthy eating behaviors. However, limited evidence exists regarding body image and its association with nutritional status in Indonesia's island communities. This study analyzes differences in body image perception and nutritional status by gender, age group, and Body Mass Index (BMI) among adolescents in Sangihe District, Indonesia

Methods: The cross-sectional study was conducted from October 2025 to March 2026 and included 787 adolescents aged 10–18 years, selected through convenience sampling from accessible schools across the island.

Result: Most respondents exhibited normal nutritional status (68.7%), while 23.6% were overweight and 7.6% were underweight. No significant differences were observed in body image scores (p=0.731) or BAZ values (p=0.831) between males and females. A significant difference in body image scores was found between the puberty and post-puberty age groups (p=0.013). No significant differences in body image scores were identified across nutritional categories (p=0.866).

Conclusion: In this island context, puberty appears to be a more influential factor in body image than gender or nutritional status. These findings underscore the importance of holistic,developmentally sensitive, and gender-inclusive health promotion programs tailored to the unique context of adolescents on Indonesian islands.

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Keywords: Body Image, Adolescent, Nutritional Status.

BACKGROUND

Adolescence is a transitional period from childhood to adulthood characterized by rapid physiological, sexual, neurological, and behavioral changes. Increased physical growth and development heighten adolescents' nutritional needs. Adequate nutrient intake is essential to maximize growth potential, and failure to achieve optimal nutrition leads to delayed and stunted growth in adolescents (1).

Adolescents in Indonesia face the triple burden of malnutrition: undernutrition, overnutrition, and micronutrient deficiencies (2). National data indicate that the majority of adolescents in Indonesia have a normal nutritional status (76.1%). However, two nutritional issues remain: undernutrition and overnutrition. Cumulatively, undernutrition accounts for 7.6% (comprising 1.9% in the very underweight BMI category and 5.7% in the underweight category), while overnutrition accounts for 16.2% (comprising the overweight and obese BMI categories). At the provincial level, the pattern observed in North Sulawesi exhibits distinct characteristics. The proportion of adolescents in the underweight category (severely underweight and underweight) is lower (5.8%) compared to the national figure (7.6%). Conversely, the prevalence of overweight and obesity is higher (18.9%) than the national average (16.2%) (3). These differences indicate the role of unique local determinants, such as dietary patterns, physical activity, and socio-cultural-ecological factors in island regions. In the context of such a nutritional transition, psychosocial factors such as body image perception become increasingly relevant to understand.

Physical changes during puberty are often the primary trigger for body dissatisfaction. Today's adolescents live amid a constant flood of digital information. Social media, accessible via personal devices, constantly presents ideal body standards that are often unrealistic and serve as a dominant source of pressure regarding appearance (4). This kind of exposure can trigger social comparison, which in turn increases the risk of body dissatisfaction (4, 5). As a result, adolescents at the peak of their vulnerability to physical changes are more likely to feel dissatisfied with their bodies (6, 7). Research in Indonesia shows that more than half of adolescent girls do not have high body esteem, and about a quarter report restricting their food intake or engaging in excessive exercise (7).

Globally, the literature shows differences in body image perceptions based on gender, where adolescent girls tend to be more dissatisfied and desire a thinner body, while boys tend to desire a muscular body (6). In addition to body image perceptions, adolescents' eating patterns can be influenced by cultural factors; access to information and food availability can affect adolescents' body image and nutritional status (8).

Geographic characteristics such as relative isolation, dependence on local food sources, and more homogeneous sociocultural dynamics may shape body image perceptions that are fundamentally different from those of urban adolescents. Research in the Pacific region indicates that ethnicity and cultural identity moderate the relationship between body weight status and body satisfaction, suggesting that ideal body standards are not universal (9). Additionally, a multisite study in Indonesia found that adolescents' body satisfaction is closely linked to gender norms and local social contexts (10). Access to social media and the diversity of digital content certainly vary across island regions. Research on Pacific Island adolescents shows that higher recreational internet use is associated with increased body weight misperceptions, indicating that limited digital access may influence body perceptions differently (11). Furthermore, the economic structure in island communities such as the fishing and agricultural sectors, which involve all family members regardless of gender, can foster expectations regarding physical form and ability that transcend gender boundaries. In fishing communities, the body is viewed in terms of physical capacity and resilience rather than solely in terms of gender-polarized aesthetic standards (12, 13).

To date, research on body image dynamics and their relationship to nutritional status among adolescents in Indonesia's island regions remains very limited. In fact, no study has specifically examined differences in body image perceptions based on gender and demographic groups in island regions such as Sangihe Islands Regency. This study is the first to simultaneously measure body image perceptions,

nutritional status, and differences by gender and age group among adolescents in the Sangihe region. Therefore, this study aims to analyze differences in body image perceptions and nutritional status based on gender and age group among adolescents in Sangihe Islands Regency, Indonesia. This understanding is crucial for developing holistic interventions that address not only nutritional issues but also adolescents' mental health, taking gender aspects into account and tailoring them contextually to the needs of adolescents in island regions.

METHODS

Study Design

A cross-sectional design was employed.

Sample/Participants

The target population comprised all adolescents aged 10–18 years residing in Sangihe Regency (N = 19,390, based on 2023 data from the Central Statistics Agency (14). Due to the geographical dispersion of the archipelago and logistical constraints associated with inter-island transportation, random (probability) sampling was not feasible. Consequently, convenience sampling, a non-probability technique based on ease of access and participant availability, was utilized (15). This method was selected for its cost-effectiveness, time efficiency, and suitability in contexts where constructing a comprehensive sampling frame is impractical, as in island settings (15, 16). Samples were obtained from accessible junior high and high schools on the main islands. In total, 787 respondents were recruited from all reachable schools during the data collection period, representing approximately 4.06% of the regency's adolescent population. Respondents were grouped into pubertal (10–14 years) and post-pubertal (15–18 years) based on the WHO's classification of adolescent development and considerations regarding the school curriculum at the study site (18). This age-based approach was chosen because biological examinations, such as Tanner staging, cannot be performed due to sociocultural norms in island communities that reject physical examinations related to secondary sexual characteristics.

Instruments

Sociodemographic data were collected using a questionnaire that included gender and date of birth to calculate age. Nutritional status was assessed using Body Mass Index for Age (BMI-for-age). Body weight was measured with a digital scale, and height was measured with a microtome. BMI-for-age Z-score (BAZ) values were calculated using WHO AnthroPlus software. Nutritional status categories followed the 2007 WHO standards: Severely thin (BAZ < -3 SD), Thin (BAZ -3 to -2 SD), Normal (BAZ -2 to +1 SD), Overweight (BAZ > +1 SD), and Obese (BAZ > +2 SD). For analysis, the severely thin and thin categories were combined into the underweight category, and the overweight and obese categories were combined into the overweight category.

The body image questionnaire used in this study was adapted from an instrument developed by Diza Liane Sahputri (2015) based on Kozier's (1998) theories of the Physical Self and the Personal Self, which measures adolescents' perceptions of and satisfaction with their physical appearance (17). This instrument consists of 10 statements on a 1-4 Likert scale covering aspects of appearance, satisfaction with specific body parts, and the desire to have an ideal body shape. The instrument's validity was tested on 30 respondents outside the sample using Pearson's Product-Moment correlation, and all items were deemed valid (calculated r > table r), while the reliability test yielded a Cronbach's Alpha value of 0.884, indicating very good internal consistency. Although this instrument has not yet been validated nationally, it has been pilot-tested on a population of Indonesian adolescent girls and has demonstrated adequate validity and reliability. The selection of this instrument was based on considerations of practicality and time efficiency in the field, given the archipelago's challenging geographical conditions. Furthermore, the validation study

of the body image instrument among Indonesian adolescents by Garbett et al. reinforces that a similar approach can be applied validly in this population (7).

Data Collection

Data collection conducted from October 2025 to March 2026 in Sangihe Islands Regency, North Sulawesi Province, Indonesia. This regency comprises an archipelago situated 140–150 km from the provincial capital and is accessible exclusively by sea or air. Inter-island mobility primarily relies on sea transport. The local population is predominantly engaged in fishing, coconut farming, and small-scale business activities that utilize regional resources. Food availability in the regency remains dependent on supplies imported from outside the region.

Data Analysis

Data were analyzed using IBM SPSS Statistics 27. The Kolmogorov-Smirnov normality test indicated that the data were not normally distributed ($p < 0.05$). Therefore, data are presented as the median (interquartile range, IQR). Differences in body image scores and BAZ based on gender and age group were tested using the Mann-Whitney U Test. Differences in body image scores across nutritional status categories were tested using the Kruskal-Wallis H Test. The level of statistical significance was set at $\alpha < 0.05$.

Ethical Consideration

This study was approved by the Health Research Ethics Committee of the Manado Ministry of Health Polytechnic (Number. DP.04.03/FXXX.28/480/2025). Permission was also obtained from the Department of Education and the school. Participants and parents/guardians provided written informed consent and assent. Data confidentiality was ensured.

RESULT AND DISCUSSION

RESULT

Characteristics of Participants

The characteristics of the respondents are presented in Table 1 , including gender, Age, and BMI

Table 1. Characteristics of Responden (n=787)

Characteristics	Category	n	(%)
Gender	Male	360	(45.7)
	Female	427	(54.3)
Age Group*	Pubertal	321	(40.8)
	Post-pubertal	466	(59.2)
BMI	Underweight	60	(7.6)
	Normal	541	(68.7)
	Overweight	186	(23.6)

Table 1 indicates that the respondents were predominantly adolescent females, with most being post-pubertal. According to body mass index (BMI) categories, 541 respondents (68.7%) were classified as normal weight, 186 (23.6%) as overweight, and 60 (7.6%) as underweight.

Table 2. Differences in Body Image Scores and Nutritional Status by Age Group and Gender

Variable	Age	n (%)	Median (IQR)	Mean Rank	U	Z	p-value
Body Image	Pubertal	321 (40.8)	21 (19–23)	418.23	67.016	-2.494	0.013*
	Post-pubertal	466 (59.2)	21 (19–23)	377.31			
	Male	360 (45.7)	21 (19–23)	390.99	75.775	-0.343	0.731
	Women	427 (54.3)	21 (19–23)	396.54			
BAZ (BMI-for-age Z-score)	Pubertal	321 (40.8)	-0.25 (-1.10–0.83)	384.72	71.813	-0.951	0.233
	Post-pubertal	466 (59.2)	-0.11 (-1.04–1.03)	400.39			
	Male	360 (45.7)	-0.18 (-1.00–0.78)	392.11	76.181	-0.214	0.831
	Women	427 (54.3)	-0.16 (-1.13-1.08)	395.59			

The results of the Mann-Whitney analysis in Table 2 indicate a significant difference in body image scores between the pubertal and post-pubertal groups (p=0.013). Based on gender, there was no significant difference in body image scores (p=0.731) between male and female adolescents. When examined using BAZ (BMI for age Z-score), adolescents in the pubertal age group had a lower median (-0.25) than those in the post-pubertal age group (-0.11). There was no significant difference in BAZ values between the two groups (p = 0.233). Statistical analysis also showed no difference in BAZ by gender (p-value = 0.831).

Table 3. Differences in Body Image Scores Based on Nutritional Status Categories

BMI	n (%)	Median (IQR)	Mean Rank	χ^2df	p-value
Underweight	60	21 (19–23)	396.21		
Normal	541	21 (19–23)	396.43	0.288 (2)	0.866
Overweight	186	21 (19–23)	386.22		

Table 3 indicates that body image scores do not differ significantly among adolescents with underweight, normal, or overweight nutritional status (p-value = 0.866).

DISCUSSION

The results of this study confirm the presence of a double burden of malnutrition among adolescents in Sangihe, with a notable trend toward overnutrition. Sangihe's status as an archipelago limits its capacity for independent food production, resulting in continued reliance on external food supplies. The availability of fresh foods, particularly fruits, is limited by seasonality. Consequently, limited access to diverse foods has increased the prevalence of processed and instant foods in the local diet. According to the Central Statistics Agency, Sangihe residents consume an average of 0.377 packs of instant noodles per capita per week, compared to 0.717 packs in Manado, the provincial capital (19). These figures indicate that processed and instant foods are a significant component of the Sangihe diet, including among adolescents. The observed dual nutritional burden may be attributed to similar dietary patterns and socio-economic factors, where food access and quality are influenced by familial and environmental determinants (20).

Among adolescents, these dietary challenges are intensified by modern lifestyle factors, such as peer influence, exposure to food trends on social media, and reduced physical activity associated with increased smartphone use. Peer-shared food content on social media has been found to exert greater influence than commercial advertising, contributing to higher consumption of calorie-dense foods and lower intake of fruits and vegetables among adolescents (21). Additionally, increased use of screen-based devices has led to increased sedentary behavior, with most adolescents aged 11–15 spending two or more hours in front of screens on school days (22,23).

The study's findings indicate that pubertal status is a primary determinant of body image formation among adolescents in the Sangihe Islands. This observation is consistent with adolescent development theories, which emphasize that puberty is marked by rapid physical changes and is a critical period for the

development of self-concept and body image. Physical changes during puberty often lead to dissatisfaction with body shape and size (24). Adolescents are particularly vulnerable to social judgments about appearance during this stage of identity development. Access to social media further reinforces body dissatisfaction. The Central Statistics Agency (2025) reports that 77.57% of Indonesia's population uses the internet for social media, with 13% of users aged 13–18 years (25). The proliferation of social media has significantly altered how adolescents construct and perceive body image. Multiple studies have shown that adolescents frequently compare themselves to idealized figures on social media (26), a process that can exacerbate negative body image, increase dissatisfaction, and influence eating behaviors (27). In Sangihe, with a relatively small and homogeneous population, physical changes during puberty can be experienced more intensely. The social environment and the limited variety of ideal body images in the real world lead adolescents to rely on body standards presented on social media as benchmarks, where algorithms on digital platforms expose users more frequently to unrealistic ideal body images (28, 29). The interaction between unrealistic body standards and the physical changes adolescents experience triggers social comparison, increasing body dissatisfaction across all adolescent age groups (30). However, the impact is more significant during puberty because adolescents are at the peak of physiological vulnerability while simultaneously forming their self-identity, making it easier for unrealistic body-image ideals to be internalized (31, 32).

The study's finding of no significant differences in body image perceptions between male and female adolescents contrasts with previous research, which typically reports higher levels of body dissatisfaction among females. For example, Farahani (2022) found that overweight or obese women exhibit more negative body image than men in the same weight category (33). Similarly, research in Taiwan indicates that young women are more likely to perceive themselves as overweight, whereas young men often feel they are too thin (21). Rodgers (2022) further noted that adolescent girls are particularly susceptible to social comparisons on digital platforms, which intensify negative body image and influence eating behaviors. Nevertheless, some studies align with the present findings, suggesting that male and female adolescents may share similar body image profiles (34). Both genders experience dissatisfaction related to being overweight, with social pressure, internalized beauty standards, and appearance comparisons affecting boys and girls alike (35).

The lack of gender differences in body image perceptions may be attributed to the uniformity of social pressures and cultural influences in relatively isolated archipelagos such as the Sangihe Islands. In contrast, urban environments often promote gender-polarized body ideals through extensive social media exposure, with the "thin ideal" emphasized for women and the "muscular ideal" for men (30). This polarization is reinforced by repeated exposure to gender-specific visual content on social media platforms (36). As a result, women in urban settings are generally more susceptible to appearance-based social comparison, with the nature of comparison differing by gender (37). However, this explanation remains hypothetical, as the present study did not directly assess individual media exposure, content types, or adolescents' perceptions of gender-based body ideals.

A further explanation may involve the socioeconomic context of the Sangihe Islands. In these island communities, economic activities such as fishing and agriculture are not highly gender-segregated and typically involve the entire family. This dynamic fosters expectations regarding physical capacity and body shape that extend beyond gender distinctions. Both male and female adolescents are expected to possess strong, healthy bodies to contribute to family economic activities, reducing the emphasis on gender-specific body standards. This observation is consistent with research indicating that regular physical activity is negatively associated with body dissatisfaction among adolescents, regardless of gender (38). However, this interpretation remains speculative, as the study did not directly measure individual media exposure, household labor division, community norms regarding physical capacity, or adolescents' perceptions of gender roles in economic activities.

The results of this study contrast with previous research reporting higher BMI values in males compared to females (39, 40). In Sangihe, adolescent girls and boys exhibit nearly identical BMI scores, which may be explained by similar patterns of physical activity and dietary habits across genders. This finding underscores that gender differences in adolescent BMI are influenced not only by biological factors but also by social and cultural norms shaping eating behaviors and physical activity. In many contexts, gender-based norms restrict women's participation in physical activity, contributing to energy imbalances and differences in body weight (41). However, in the Sangihe Islands, where economic activities such as fishing and agriculture involve all family members, the gender gap in physical activity is likely reduced, resulting in comparable nutritional status. Supporting this, a study in rural Montenegro also found no significant differences in nutritional status between male and female adolescents (42).

Some studies suggest that height and weight are the primary predictors of BMI in adolescent boys, while additional factors such as body fat percentage and fat distribution are more relevant for girls (43). However, findings from Sangihe indicate that these gender-based differences may be less pronounced within certain social, economic, and cultural contexts. Cross-national research demonstrates that adolescents' nutritional status is strongly influenced by socioeconomic factors and local consumption patterns, rather than by biological gender differences alone (44). Furthermore, while adolescent girls often face greater body-related stigma, boys are also at significant risk for increased BMI (45). These observations highlight the complexity and context-dependence of gender dynamics in nutritional status. Nonetheless, this interpretation remains tentative and warrants further qualitative research to explore how social constructions of body and gender develop within island communities.

The lack of variation in body image scores across BMI categories (Table 3) suggests a disconnect between body image perceptions and objective nutritional status among adolescents in the Sangihe Islands. Research from Korea indicates that subjective health perceptions influence body image more strongly than BMI, implying that the direct association between BMI and body image is often weak (46). Similarly, studies in Jakarta found no significant relationship between body image and BMI, demonstrating that adolescents with normal BMI can still experience negative body image (47)(48). These findings support the view that BMI is not the primary determinant of adolescent body image, which is more strongly influenced by media exposure, physical activity, and interpersonal relationships (49). Additional research on late adolescents in Indonesia shows that individuals across BMI categories, including underweight, normal, overweight, and category I obesity, often report positive body image and acceptance of their body size and shape (50).

The observed disconnect between objective nutritional status and body image perception carries significant implications for adolescent health care. Early development of negative attitudes toward body weight can have lasting effects on self-esteem, body image, and mental health. Addressing these psychological consequences requires comprehensive strategies that challenge societal weight-related stigma and promote a broader understanding of body diversity (28). Effective interventions should not focus exclusively on modifying body weight or nutritional status, but should also incorporate psychological education targeting the social and psychological determinants of body perception, such as media literacy and self-esteem enhancement (51, 52). Health programs in island schools, including those in Sangihe, should integrate healthy body image modules into their curricula, as school-based interventions have demonstrated efficacy in improving adolescent body image (53).

Several limitations should be considered when interpreting these findings. The cross-sectional design measures variables at a single point in time, precluding the assessment of causal relationships between body image and BMI. Geographical and logistical challenges in the archipelago necessitated the use of convenience sampling, which restricts the generalizability of the results. The sample may not fully represent all adolescents aged 10–18 years in Sangihe Islands Regency, and the findings may not be applicable to other Indonesian archipelagic regions, particularly urban areas, larger

islands, or populations with different socio-cultural backgrounds. The body image instrument employed did not comprehensively assess affective, cognitive, and behavioral dimensions. Additionally, participant grouping into pubertal (10–14 years) and post-pubertal (15–18 years) categories was based solely on age, following WHO guidelines, which is less precise than biological indicators such as Tanner staging or the Pubertal Development Scale (PDS). Cultural constraints prevented the use of physical examinations related to secondary sexual characteristics, as these were deemed inappropriate by parents and school authorities. This limitation is acknowledged, and the use of PDS is recommended for future research. Important factors influencing body image and nutritional status, including socioeconomic status, physical activity, dietary patterns, and social media exposure, were not comprehensively measured or controlled for, potentially introducing unobserved confounding. As a result, the contextual interpretations presented remain hypothetical and require validation through future studies incorporating these variables. Self-reported data are also subject to recall and social desirability biases, which may affect the accuracy of responses. Despite these limitations, the study has notable strengths. It successfully collected a relatively large sample from a remote island adolescent population, overcoming significantlogistical barriers. The measurement instruments used were standardized and demonstrated established validity and reliability. This research represents a pioneering effort to examine body image and nutritional status among adolescents in the Indonesian archipelago, a context that has been underrepresented in the literature. The findings provide a valuable foundation for future, more comprehensive research in this region.

CONCLUSION

This study assessed differences in body image perception and nutritional status by gender, age group, and BMI category among adolescents in Sangihe Island Regency, Indonesia. Results indicate that age development, especially pubertal status, plays a more significant role in shaping body image perceptions than gender or nutritional status. No significant differences were observed in body image scores or nutritional status between male and female adolescents, nor among those with underweight, normal, or overweight status. These findings underscore the need for a contextual public health approach that considers developmental stage when addressing adolescent body image in island settings. As the study did not directly measure sociocultural factors, media exposure, dietary patterns, or gender roles, interpretations regarding these influences remain speculative and require further research. Nutritional interventions for adolescents in island regions should prioritize developmental stage rather than assume gender-based differences. School-based programs that promote healthy body image and media literacy are urgently needed for all adolescents, regardless of gender or nutritional status, particularly in underserved island communities such as Sangihe.

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AUTHOR'S CONTRIBUTION STATEMENT

FG and MDK contributed to this article. FG was responsible for the writing of the original draft, methodology, investigation, data curation, resource provision and overall supervision. MDK performed the formal analysis and validation, and was responsible for the visualization, as well as the review and editing of the manuscript. All authors have read and agreed to the published version of the manuscript.

CONFLICT OF INTEREST

None.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

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DATA AVAILABILITY

The dataset generated and analyzed during the current study is available from the corresponding author upon request.

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