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Body image perception is associated with nutritional status of adolescent girls: A cross-sectional study in Denpasar City, Bali Province, Indonesia

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ABSTRACT

Background and purpose: Adolescent psychopathological conditions influence body image perception which can lead to eating disorders, resulting in nutritional and health problems The objective of this study is to analyze the relationship between body image perception, eating disorders, and the nutritional status of adolescent girls.

Methods: This is a quantitative observational study using a cross-sectional design. The study was conducted at SMP Negeri 8 Denpasar and SMP Raj Yamuna in 2022 involving 90 students. Data collected included characteristics, body image perception, eating disorders, weight, and height. Data collection instruments included questionnaire, Multidimensional Body Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) for body image perception, anthropometric measurement tools and the Eating Disorder Diagnostic Scale (EDDS). The data was analysed including descriptive analysis and Chi-square test.

Results: The respondents were aged between 12–15 years, with the highest proportion was age 13 years at 42.2%. The majority of adolescent girls (44.8%) were in grade VIII. More than half (54.4%) tend to have a positive body image perception, whilst the majority experienced eating disorders at 86.7%, and had normal nutritional status at 75.6%. Body image perception associated with nutritional status of adolescent girls (OR=4.587; 95%CI: 1.589-13.237; p=0.003).

Conclusion: Body image perception is related to the nutritional status of adolescent girls in Denpasar. Therefore, peer counselors are needed to improve adolescent communication, including promoting nutritional action messages through appealing social media approaches. Then, interventions at school are also needed including to define the role of peer supports.

Keywords: Adolescent, body image, earing disorder, nutritional status

INTRODUCTION

The 2018 Basic Health Research in Indonesia indicated that the prevalence of low height-for-age (stunting) among adolescents aged 13-15 years was 25.7%, and among those aged 16-18 years was 26.9%. Additionally, the prevalence of low body mass image (BMI)-for-age was 8.7% for adolescents aged 13-15 years and 8.1% for those aged 16-18 years with underweight conditions. Meanwhile, the prevalence of overweight and obesity was 16.0% among adolescents aged 13-15 years and 13.5% among those aged 16-18 years.[1]

According to the 2018 Indonesia Basic Health Research for Bali Province, BMI-for-age in adolescents aged 13-15 years was categorized as severely short at 2.23%, short at 10.92%, severely thin at 1.06%, and thin at 5.52%.[2] The results of the Nutritional Status Monitoring in 2021 conducted by the Denpasar City Health Office, involving 1,432 junior high school students, showed a varied nutritional status in Denpasar City, including severely thin 1.2%, thin 2.9%, overweight 1.5%, and obese 0.8%. This issue is intriguing for analyzing the factors contributing to nutritional problems among junior high school students, particularly considering adolescent psychopathology.

Health issues in adulthood are closely related to the health status during adolescence, and this is highly significant within an individual's life cycle.[3] Health behaviors and lifestyles during young age, including adolescence, are crucial to pay attention to as they form a critical foundation in creating a productive and high-quality human resource for the future.[4] Adolescent nutritional problems continue to be a major concern globally, including in Indonesia. Government programs targeting adolescents are an investment in adolescent health, as advocated by United Nations International Children's Emergency Fund (UNICEF) in addressing the triple burden of malnutrition among adolescents in Indonesia, emphasizing that addressing nutritional issues in adolescents, especially adolescent girls, is a significant asset for economic and social progress. Therefore, their health and nutritional status will have a profound impact on the generations they will bring into the world.[5]

Nutritional problems in adolescent girls have a higher risk and require increased attention due to their critical growth phase, potential long-term health impacts, unique nutritional needs, and societal influences on dietary habits and body image perceptions. Health issues in adolescents can arise due to risky behaviors such as unhealthy food consumption, poor sanitation, excessive fat intake, and lack of physical activity.[6] These conditions can lead to nutritional problems among adolescents, which usually influenced by peer pressure and social media affecting their dietary patterns and physical activities.[7] Additionally, negative body image perception is often experienced by adolescents, which can trigger eating disorders and affect nutritional status.[8] The interconnection between body perception, eating disorders, and nutritional status needs to be understood to identify the complex issues that impact the psychological development of adolescents.[7,9,10]

The Austria Academy for Eating Disorders (2006) states that various forms of eating disorders are reported to occur in 4.0% of adolescents and young adults. Approximately 95% of patients are females, and these disorders typically develop during adolescence and sometimes in adulthood. The risk is very high for girls aged 12-15, with almost 0.5% experiencing anorexia nervosa and 5-18% tending towards bulimia nervosa. The long-term mortality rate for anorexia nervosa and bulimia nervosa is up to 10-15%, while obesity occurs in almost 15% of adolescents.[11]

According to a study conducted by Galmiche, Déchelotte, Lambert, & Tavolacci in 2019, there was an

increase in the global prevalence of eating disorders from 3.5% in 2000-2006 to 7.8% in 2013-2018.[12] The occurrence of eating disorders in Indonesia is difficult to ascertain precisely due to the shame felt by sufferers in seeking help and treatment, as well as the rejection and lack of understanding of the symptoms of eating disorders.[13] Through this research, we aim to identify the nutritional status of adolescents in connection to psychopathological conditions including body image perception and eating disorders among adolescent girls in Denpasar.

METHOD

This study utilized an analytical observational quantitative design with a cross-sectional approach. The research was conducted in Denpasar. Denpasar is the capital of Bali Province, Indonesia, so it is known as the economic center of Bali, including the center for street food and fast-food restaurants. The atmosphere and conditions in Denpasar will influence the emergence of nutritional disorders.

Data collection was conducted on May 27, 2022 and July 27, 2022. The initial populations consisted of all adolescent girls in Denpasar, while the accessible population narrowed down to female junior high school students specifically in East Denpasar. The sample size calculation was conducted utilizing the formula for estimating the difference in proportions between two independent sample groups by Lemeshow (1997),[14] considering a confidence level of 95% and a power of 80%. The proportion of teenagers who experience eating disorders with nutritional disorders (P1) is 50.0% and the proportion of teenagers who do not have eating disorders and with nutritional disorders is 20.4%.[15] Based on this calculation, a minimum sample size of 40 individuals for each sample group was determined, resulting in a total of 90 participants for the study.

The inclusion criteria were female teenagers aged 13-15 years and registered as students at a school in the research location, students who were absent during data collection were excluded. The samples were selected through multi-stage approach, started with purposive selection of sub-districts and East Denpasar sub-district was selected considering that this area was close to tourist areas and the development of restaurants and food and beverage establishments close to schools. Two schools were then randomly selected, one is a public school (SMP Negeri 8 Denpasar) and one is a private school (SMP Raj Yamuna). The samples were all eligible female students from SMP Negeri 8 Denpasar and SMP Raj Yamuna who met the inclusion criteria and were present during data collection. Fourty five female students at each school were selected by systematic random sampling.

The collected data were including body weight, height, body image perception, and eating disorders. The research variables consisted of two independent variables, namely body image perception and eating disorders, along with one dependent variable, which was nutritional status. Nutritional status reflected the nutritional condition of adolescent girls, measured using the anthropometric index of BMI-for-age, with Z-score boundaries distinguishing between normal and abnormal nutritional status based on the Indonesian Ministry of Health Regulation No. 2 of 2020.[16] The categorization of nutritional status includes Poor (<-3 SD), Low (-3 SD to <-2 SD), Normal (-2 SD to +1 SD), High (+1 SD to +2 SD), and Obesity (>+2 SD). Measurement of nutritional status involved weighing and measuring height, then determining BMI-for-age and categorizing it based on Z-score boundaries.

The perception of body image and eating disorders data was collected using a questionnaire. Body image perception was defined as the concept formed regarding one's body shape, size, and appearance, arising from

self-assessment and the assessment of others. Measurement of body image perception was conducted using the Multidimensional Body Self Relations Questionnaire-Appearance Scales (MBSRQ-AS) questionnaire with 30 questions answered on a Likert scale, followed by determining the median as a separator between positive and negative body image perceptions. Eating disorders were defined as a set of symptoms indicating unhealthy or abnormal eating patterns, including changes in food intake. Measurement of eating disorders was conducted using the Eating Disorder Diagnostic Scale (EDDS) questionnaire consisting of 22 questions. The questions in this questionnaire covered various aspects related to eating behaviors, including irregular eating patterns, food-related anxiety, feelings of guilt after eating, and compensatory behaviors such as vomiting or laxative use. The results of this questionnaire were then interpreted and categorized into eating disorders or not based on criteria such as anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), and Eating Disorder Not Otherwise Specified (EDNOS).

Descriptive analysis was performed to describe the frequency distribution of sample characteristics such as age, grade, body image perception, eating disorders, nutritional status, and Z-scores based on BMI/A. Bivariate analysis was conducted to determine the correlation and significance between independent and dependent variables using the chi-square test at a 95% confidence level, with a significance value (p) of <0.05. The final strength of the relationship produced was the Odds Ratio (OR).

This research has obtained permission from SMP Negeri 8 Denpasar with Reference Number: 421.73/122.a/SMPN.8/2022 dated May 23, 2022, and SMP Raj Yamuna with Reference Number: 079/SMP-RYS/VII/2022 dated July 25, 2022. The research has been declared ethically appropriate by the ethics committee of Poltekkes Kemenkes Denpasar with Ethical Clearance Number: LB.02.03/EA/KEPK/0490/2022 dated May 24, 2022.

RESULT

The female adolescents involved in this study have an age range between 12 to 15 years old. It was found that the majority of female adolescents were 13 years old, comprising 42.2%, and most of them were in the eigth grade, which was 44.8% (Table 1).

Table 1. The respondents' characteristics

Variable (N=90)	n (%)
Age (year)	
12	12 (13.3)
13	40 (44.4)
14	37 (41.1)
15	1 (1.1)
Grade	
VII	48 (53.3)
VIII	42 (46.7)

The results of the observation on body image perception, eating disorders, and nutritional status among

adolescent girls show that more than half (54.4%) of them have a positive body image perception. As many as 86.7% experience eating disorders, while 75.6% have a normal nutritional status, under and poor at 5.7%, while 18.9% were over and obese (Table 2).

Table 2 Distribution of body image perception, eating disorders, and nutritional status

Variable (N=90)	n (%)
Body Image Perception	
Positive	49 (54.4)
Negative	41 (45.6)
Eating Disorders	
Eating Disorders:	78 (86.7)
Anorexia Nervosa (AN)	(4)
Bulimia Nervosa (BN)	(3)
Binge Eating Disorder (BED)	(4)
Eating Disorder Not Otherwise Speciified (EDNOS)	(67)
No Eating Disorder	12 (13.3)
Nutritional Status	
Poor (<-3 SD)	3 (3.3)
Under (-3 SD s/d <-2 SD)	2 (2.2)
Normal (-2 SD s/d +1 SD)	68 (75.6)
Over (+1 SD s/d +2 SD)	14 (15.6)
Obesity (>+2 SD)	3 (3.3)

It is noted that the proportion of adolescent girls with a positive body image perception and those with a negative body image perception both tend to experience eating disorders, with a higher percentage observed in those with a negative body image perception, amounting to 87.8%. The statistical test for body image perception and eating disorders yielded p>0.05, indicating no significant relationship between body image perception and eating disorders at a 95% confidence interval OR=1.200 (95%CI: 0.350-4.109; p=0.771).

The Table 3 represents the analysis results regarding the relationship between body image perception and eating disorders with the nutritional status of adolescent girls in Denpasar. Based on body image perception, it was found that adolescent girls with a positive body image perception had a significantly higher proportion of normal nutritional status (63.2%). Conversely, adolescent girls with a negative body image perception tended to have a higher proportion of abnormal nutritional status (72.7%). The OR analysis showed a value of approximately 4.587 with a 95%CI between 1.589 to 13.237 and a p-value of 0.003, indicating a significant relationship between body image perception and nutritional status. Adolescent girls with a negative body image perception were 4 times more likely to have abnormal nutritional status.

Meanwhile, for the eating disorders variable, the results showed that there was no significant relationship between eating disorders and nutritional status. Adolescent girls without eating disorders (No Eating Disorder - NED) had a higher percentage of normal nutritional status (16.2%). On the other hand, adolescent girls with eating disorders (ED) showed no significant difference in the proportion between normal nutritional status (83.8%) and abnormal nutritional status (95.5%), with an OR of approximately 1.053, a 95%CI between 0.010-1.027, and a p-value of 0.163.

Table 3 Relationship between body image perception and eating disorders with nutritional status of adolescent girls in Denpasar City

Variable	Nutritional Status				OR	95%CI	p
	Abnormal		Normal				
	n	%	n	%			
Body Image Perception							
Negative	16	72.7	25	36.8	4.59	1.59-13.24	0.003
Positive	6	27.3	43	63.2			
Eating Disorders							
ED*)	21	95.5	57	83.8	4.05	0.49-33.34	0.28
NED)	1	4.5	11	16.2			

**) No Eating Disorder (NED), Eating Disorder (ED)*

DISCUSSION

This study aims to explore the relationship between body image perception, eating disorders, and nutritional status among adolescent girls in Denpasar City. The main findings indicate that adolescent girls in Denpasar tend to have a positive body image perception, while a significant portion of them experience eating disorder, and the majority have a normal nutritional status. The analysis results show that body image perception significantly correlates with the nutritional status of adolescent girls, while the relationship between eating disorders and nutritional status is less significant.

The nutritional status of adolescent girls is significantly influenced by their body image perception. The adolescent period is a critical phase as there is an increase in nutritional requirements due to rapid physical, mental, and cognitive growth and development.[17] Physical changes in adolescent girls, such as breast and hip growth, are influenced by hormonal changes. Adequate nutrition and physical activity are essential to support this process. Furthermore, mental and cognitive development begins with self-awareness and awareness of the environment.[18] Positive perceptions of body image may be influenced by environmental factors around adolescents such as social support factors. Acceptance and support from close individuals, such as parents, friends, and teachers, influence the body image of adolescents. Positive support enhances self-confidence and a positive self-image, while lack of support can result in a negative self-image.[19]

In this study, it is observed that adolescent girls with a negative body image perception tend to have a higher proportion of abnormal nutritional status and are 4.5 times more likely to have abnormal nutritional status if they have a negative body image perception. Several studies indicate that a positive body image perception is associated with healthy eating patterns and activities, whereas a negative perception can lead to nutritional problems and a lack of physical activity.[18] Negative feelings towards body image can also increase stress levels and impact overall health. Adolescent girls with a positive body image perception tend to be satisfied with their body size and shape, while those with a negative body image are likely to be dissatisfied, potentially disrupting both physical and psychological well-being.[20] Many adolescent girls perceive themselves as either too overweight or too thin, resulting in extreme dieting behaviors and excessive exercise in an attempt to achieve the desired body shape, often disregarding safety concerns.[18]

This study demonstrates that adolescent girls with a positive body image perception have a significantly higher proportion of normal nutritional status. This indicates that adolescent girls possess good self-confidence, resulting in a positive self-assessment.[18] Similarly, the nutritional status of adolescent girls in Denpasar shows that most of them are within the normal nutritional status range, with Z-scores ranging from -2 SD to +1 SD. Nutritional status is an indicator of successful nutrition fulfillment based on weight and height.[17] This suggests that the majority of adolescent girls have adopted good eating patterns and sufficient physical activity to support their physical growth and development.

Eating disorders are eating behavior deviations related to the perception of one's body shape and size, leading to desires in adolescent girls to engage in restrictive eating or vice versa. Even though this study found there is no significant association between body image and eating disorders, these disorders can result in nutritional problems, either malnutrition or overnutrition.[20] In this study, it is observed that almost the majority of adolescent girls experience Eating Disorder Not Otherwise Specified (EDNOS), which falls within the category of other eating disorders such as anorexia nervosa, bulimia nervosa, and binge eating disorder, but does not fully meet the criteria. For instance, individuals with EDNOS of the anorexia nervosa type may restrict their food intake while still maintaining a normal body weight.[19] EDNOS with bulimia nervosa and BED characteristics meet the criteria for bulimia nervosa and binge eating disorder but with lower frequency or intensity.[20]

This study indicates no relationship between eating disorders and the nutritional status of adolescent girls. Factors such as dissatisfaction with body shape, body image, family influence, peer influence, media influence, gender, and BMI play a role in this issue.[18] Adolescent girls experiencing eating disorders were prevalent, suggesting a substantial presence of eating disorders among this demographic. Additionally, no significant difference was observed between those with abnormal nutritional status and those with normal nutritional status in terms of experiencing eating disorders.[10]

Adolescents with a higher BMI tend to feel uncomfortable or ashamed of their body shape. The notion of a slim and slender physique being deemed the ideal body shape can lead adolescents to control or reduce their food intake based on their own thoughts, often resulting in disordered eating behaviors.[12] Peer influence also plays a significant role for adolescent girls. Peers can have a negative impact, such as attempting weight loss and adopting unhealthy eating habits.[18] Therefore, adolescents need to receive education about balanced nutrition and proper eating behavior to enhance awareness of the importance of maintaining a healthy body by meeting their nutritional needs.[19]

In this study, eating disorders can occur in adolescent girls with both normal and abnormal nutritional statuses. Besides eating disorders, other factors that can influence nutritional status include dietary patterns, physical activity, and overall health status.[19] Additionally, dissatisfaction with body shape, body image, family influence, peer influence, media influence, gender, and BMI are factors contributing to disordered eating behaviors in adolescent girls.[18] Adolescents with a higher BMI tend to feel uncomfortable or ashamed of their body shape. The perception of a slim and slender physique as the ideal body shape leads adolescents to control or reduce their food intake based on their own thoughts, often resulting in disordered eating behaviors.[20] Peers also play a significant role for adolescent girls. Peers can have a negative impact, such as attempting weight loss and adopting unhealthy eating habits.[19]

Therefore, adolescents need to receive education about balanced nutrition and proper eating behavior to

raise awareness of the importance of maintaining a healthy body by meeting their nutritional needs.[20] Those at high risk of experiencing eating disorders have an excess intake of energy, carbohydrates, protein, and fats. The main characteristic that determines the diagnosis of an eating disorder is a change in food consumption or absorption.[21] Additionally, the influence of mass media and the prevalent beauty standard, associating a slender and slim body as ideal, further contributes to these issues. Healthcare professionals and schools should identify eating disorders and enhance health education for adolescents, particularly adolescent girls.[20] Healthcare professionals can provide guidance and nutritional counseling services concurrently with iron supplement programs. Schools can deliver materials about adolescent development and associated health issues during committee meetings, enabling parents to comprehend and address health and nutritional issues concerning their daughters.[18]

Strengths of the study include its comprehensive analysis of body image perception, eating disorders, and nutritional status among adolescent girls, facilitated by standardized measurement tools. However, limitations arise from potential biases in data collection, such as respondents copying answers from nearby peers or providing inaccurate information, as well as distractions during questionnaire explanations. Nonetheless, these limitations are manageable and do not significantly undermine the overall quality of the study.

CONCLUSION

This study reveals that the majority of adolescent girls in Denpasar have a positive body image, experience eating disorders, and maintain normal nutritional status. Those with a positive body image tend to have normal nutritional status, while those with a negative perception tend to have abnormal nutritional status. Eating disorders are prevalent among adolescents regardless of their nutritional status. Body image perception plays a crucial role in determining the nutritional status of adolescent girls in Denpasar.

Future studies could focus on enhancing national adolescent health programs, like the Nutritional Action Program, through stakeholder engagement and training sessions to improve knowledge and skills regarding nutrition and adolescent health.

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AUTHOR CONTRIBUTION

IGAKW was responsible for developing the research methodology, data collection, and drafting the research manuscript. Meanwhile, NKS and LSA supervised the data collection and provided guidance regarding the development of the research methodology.

CONFLICT OF INTEREST

No conflict of interest declared.

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