

ASSOCIATION BETWEEN BODY IMAGE AND STRESS LEVELS AMONG ADOLESCENTS: A CROSS-SECTIONAL STUDY AMONG STUDENTS OF MADRASAH ALIYAH NEGERI 1 MEDAN

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Abstract

Approximately 14% of adolescents experience mental health disorders, including stress, while in Indonesia an estimated 9.8% of adolescents experience stress and depression. During adolescence, physical changes, beauty standards, social media exposure, and peer influence may negatively affect body image, increasing psychological distress. This study aimed to analyze the relationship between body image and stress levels among students at Madrasah Aliyah Negeri 1 Medan. A correlational study with a cross-sectional design was conducted among 92 students in grades X and XI selected using consecutive sampling. Body image and stress levels were assessed using the Body Appreciation Scale-2 (BAS-2) and the Perceived Stress Scale-10 (PSS-10), respectively. Data were analyzed using Spearman's rank correlation test. Most respondents were 15 years old (69.6%) and female (52.5%), with the majority reporting moderate body image (51.1%) and moderate stress levels (56.5%). Spearman's rank correlation showed a significant negative association between body image and stress levels ($r = -0.634$, $p < 0.001$), indicating that students with more positive body image tended to report lower perceived stress. These findings suggest that promoting positive body image may contribute to reducing stress and supporting mental health among adolescents.

Keywords: *Body image, Adolescents, Stress levels, Students, Mental health*

INTRODUCTION

Stress is one of the most common mental health problems among adolescents and has become an important public health concern worldwide. Adolescence is characterized by rapid biological, psychological, and social changes that increase vulnerability to emotional distress. According to the World Health Organization (WHO), approximately one in seven adolescents aged 10–19 years experiences a mental health disorder. Recent evidence also suggests that academic demands, social media exposure, and concerns about physical appearance are major contributors to psychological stress among adolescents (Ministry of Health of the Republic of Indonesia, 2018).

Body image refers to an individual's perceptions, thoughts, and feelings about their physical appearance. During adolescence, pubertal changes and increasing social comparison make body image an important determinant of psychological well-being. Previous studies have consistently reported that negative body image is associated with depression, anxiety, low self-esteem, eating disorders, and psychological distress (Ernis et al., 2022). Although the relationship between body image and mental health has been widely investigated, several important gaps remain. Most previous studies have focused on female adolescents, university students, or the association between body image and eating disorders, self-esteem, and depression. In contrast, evidence regarding the relationship between body image and perceived stress among school-aged adolescents remains limited, particularly within Indonesian Islamic senior high schools (Madrasah Aliyah). Furthermore, studies involving adolescents from religious-based educational settings

are still scarce, despite evidence suggesting that school environment, sociocultural context, and religious values may influence adolescents' body image and psychological well-being (Ernis et al., 2022; Bancin et al., 2023).

Addressing this gap is important because adolescents attending Madrasah Aliyah experience the same developmental challenges as other adolescents while studying within a religious-based educational environment that may shape psychological adaptation differently. However, empirical evidence regarding the relationship between body image and stress in this population is still insufficient. Therefore, this study was conducted among students of Madrasah Aliyah Negeri 1 Medan to provide context-specific evidence regarding the association between body image and stress among Indonesian adolescents (Bimbingan et al., nd).

This study contributes to the existing literature by examining both male and female adolescents using standardized and validated psychological instruments, namely the Body Appreciation Scale-2 (BAS-2) and the Perceived Stress Scale-10 (PSS-10). The findings are expected to expand current evidence regarding adolescent mental health in religious-based schools and provide scientific evidence for future mental health promotion programs (Ningsih et al., 2023).

Therefore, this study aimed to determine the association between body image and stress levels among students of Madrasah Aliyah Negeri 1 Medan. We hypothesized that adolescents with more positive body image would report significantly lower perceived stress levels than those with poorer body image.

METHOD

This study employed an analytical correlational design with a cross-sectional approach and was conducted from November to December 2024 at Madrasah Aliyah Negeri 1 Medan, North Sumatra, Indonesia. Ethical approval was obtained from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Muhammadiyah Sumatera Utara (No. 1365/KEPK/FKUMSU/2024). Prior to data collection, permission to conduct the study was obtained from the school administration. The minimum required sample size was calculated using the sample size formula for correlation studies, resulting in a minimum of 92 participants, who were subsequently recruited using consecutive sampling. The inclusion criteria were students enrolled in grades X and XI who agreed to participate by providing written assent and informed consent and were willing to complete the questionnaires. Students with psychological disorders, those who declined participation, or those with serious physical health conditions were excluded from the study.

Before completing the questionnaires, all participants were informed about the objectives and procedures of the study, and written informed consent was obtained. Participants were assured that their participation was voluntary and that all personal information would be kept confidential and used solely for research purposes. Primary data were collected using self-administered questionnaires under the supervision of the researchers. Body image was assessed using the Body Appreciation Scale-2 (BAS-2), which has demonstrated excellent cross-cultural validity through translation and adaptation in more than 65 countries and 40 languages, with excellent reliability (Cronbach's $\alpha = 0.95$; test-retest reliability = 0.92). Perceived stress was measured using the Perceived Stress Scale-10 (PSS-10), which has demonstrated good construct validity based on confirmatory factor analysis (CFA), confirming a two-factor structure consisting of perceived stress and perceived control, as well as good internal consistency (Cronbach's $\alpha = 0.78$ –0.91).

Descriptive (univariate) analysis was performed to summarize the characteristics of the respondents and the distribution of body image and stress levels. Data normality was assessed using the Kolmogorov–Smirnov test. Because the data were not normally distributed, the association between body image and stress levels was analyzed using Spearman’s rank correlation coefficient. Statistical significance was established at $p < 0.05$.

RESULTS AND DISCUSSION

Table 1 Distribution of Subject Characteristics

Subtitle	Unit
Age (years)	15 (14, 16)
Height (cm)	159,6 ± 7,5
Weight (kg)	53,5 (38, 95)
Gender (n%)	
Male	44 (47,8)
Female	48 (52,5)

Table 1 shows that the study sample consisted of adolescents with a median age of 15 years (range 14–16 years), an average height of 159.6 ± 7.5 cm, and a median body weight of 53.5 kg (range 38–95 kg). The gender distribution was balanced, with 47.8% males and 52.2% females. The variation in height and body weight indicates differences in physical characteristics within the sample, which may influence body image belief and stress levels.

Table 2 Description of Subject Body Image
Using the BAS-2 Questionnaire

BAS-2 Interpretation	Frequency (n)	Percentage (%)
Low	29	31.5
Moderate	47	51.1
High	16	17.4
Total	92	100

Table 2 shows that most subjects (47 subjects or 51.1%) had BAS-2 scores in the moderate category, with total scores ranging from 31 to 40. A total of 31.5% of the subjects had scores in the low category, with total scores ranging from 10 to 30, being nearly one-third of the total sample. Meanwhile, 17.4% of the subjects were classified as having high body appreciation, with scores ranging from 41 to 50, showing that only a small proportion of the subjects had high BAS-2 scores.

Table 3 Overview of Stress Levels Using
PSS-10 Questionnaire

PSS-10 Interpretation	Frequency (n)	Percentage (%)
Low	22	23.9
Moderate	52	56.5
High	18	19.6
Total	92	100

Table 3 shows that most subjects (52 subjects or 56.5%) experienced moderate stress levels, with scores ranging from 15 to 26, showing that more than half of the sample fell within the moderate stress category. A total of 22 subjects (23.9%) experienced low stress levels, with scores ranging from 1 to 14, reflecting that approximately one-quarter of the total sample experienced low stress. Meanwhile, 18 subjects (19.6%)

were classified as experiencing high stress levels, with scores above 26, showing that 20% of the subjects experienced higher levels of stress. Overall, most subjects experienced moderate stress levels, with smaller proportions experiencing low and high stress levels.

Table 4 Correlation Between Body Image and Stress Level

Body Image	Stress Level								Nilai P	Nilai r
	Low		Moderate		High		Total			
	N	%	N	%	N	%	N	%		
Low	2	9.1	12	23.1	15	83.3	29	31.5	<0.001	-0.634
Moderate	7	31.8	37	71.2	3	16.7	47	51.1		
High	13	59.1	3	5.8	0	0.0	16	17.4		
Total	22	100%	52	100%	18	100%	92	100%		

Table 4 shows a significant relationship between body image and stress levels, with a *p-value* of <0.001 and a correlation coefficient (*r*) of -0.634. Among the 29 respondents with low body image, the majority (15 individuals or 83.3%) experienced high stress, 12 individuals (23.1%) experienced moderate stress, and 2 individuals (9.1%) experienced low stress. Among the 47 respondents with moderate body image, most (37 individuals or 71.2%) experienced moderate stress, followed by 7 individuals (31.8%) with low stress and 3 individuals (16.7%) with high stress. In contrast, among the 16 respondents with high body image, the majority (13 individuals or 59.1%) experienced low stress, while 3 individuals (5.8%) experienced moderate stress, and none experienced high stress (0.0%). These findings say that individuals with lower body image tend to experience higher stress levels. The negative correlation coefficient suggests that as body image increases, stress levels tend to decrease.

Discussion

The mean age of the respondents was 15 years. This age falls within the early to middle adolescence phase, which is represents as a period of significant physical, emotional, and psychosocial development. At the age of 15, individuals are typically undergoing puberty, which is marked by rapid physical changes such as increases in height, redistribution of body fat, and the development of secondary sexual characteristics that may influence satisfaction with body image. These rapid physical changes can affect self-perception, particularly body image (Grogan, 2021; Ningsih et al., 2023). At this stage, adolescents tend to be extremely sensitive to their physical appearance, which is frequently influenced by prevailing societal standards of attractiveness as well as exposure to social media. Dissatisfaction with one's body may arise when adolescents perceive that their physical appearance does not conform to these standards. This condition can contribute to higher levels of stress due to the pressure to meet such social expectations (Grogan, 2021).

Scientifically, the relationship between body weight, body image, and stress can be interpreted based on psychological theories and earlier studies proving that negative body image is associated with increased stress levels. Based on the data, females were more often found in the body weight category of <50 kg, which may lead to body dissatisfaction if they perceive that their bodies do not conform to social standards emphasizing the ideal body shape. This dissatisfaction with one's body, commonly referred to as body dissatisfaction, has been shown to increase stress levels because individuals may feel pressured or anxious about their physical appearance (Dondzilo & Basanovic, 2023; Cash & Smolak, 2011). On the other hand, males were more frequently categorized in the body weight group of ≥50 kg, which may also expose them to social pressure to achieve a more masculine or ideal body according to prevailing standards. Previous studies have shown that negative body image among males, often influenced by perceptions related to strength or muscularity, can lead to stress and anxiety (Griffiths et al., 2017). This stress is frequently

associated with the inability to meet desired body expectations, whether it involves achieving a slimmer body for females or a more muscular physique for males. Overall, both females with lower body weight and males with higher body weight may be at risk of experiencing stress due to negative body image, which is influenced by social comparison and pressure to meet societal standards of beauty or masculinity (Grogan, 2021).

There were also differences in the distribution of gender within height categories, with females being more dominant in the height category of <160 cm (82.6%), while males were more dominant in the ≥ 160 cm category (78.3%). This difference may be explained by biological and social factors that influence individuals' perceptions of their bodies. Biologically, differences in height between males and females are influenced by genetic and hormonal factors. Males generally tend to have greater height than females, which may influence their perception of body image. Previous studies indicate that taller males are often perceived as more masculine, which may contribute to higher levels of self-confidence (Griffiths et al., 2017).

On the other hand, females with shorter stature may experience lower self-confidence or feel that they do not meet the ideal standards of beauty, which often emphasize taller body proportions. This condition may contribute to negative body image and increase social anxiety or stress. Previous studies have shown that negative body image among females is associated with a higher risk of eating disorders and elevated stress levels (Mardianti, 2024). Overall, the differences in gender distribution across height categories indicate that biological and social factors interact in shaping individuals' perceptions of their bodies, which may subsequently influence the level of stress they experience (Niswah & Zahro, 2021; Anindita, 2021).

The distribution of body image among the subjects based on BAS-2 scores showed that the majority of respondents (51.1%) were categorized in the moderate category. This finding reflects a neutral perception of body image, in which individuals are neither fully satisfied nor dissatisfied with their bodies. This condition illustrates that adolescents tend to have a relatively balanced perspective toward their body image, although it may still be influenced by social and psychological factors. A total of 31.5% of respondents had low body image, indicating dissatisfaction with their physical appearance. In contrast, only 17.4% of respondents were categorized as having high body image, which reflects a higher level of self-acceptance and body satisfaction. Such positive body image can act as a protective factor against social pressure and stress (Grogan, 2021).

The relatively low body image observed among a considerable proportion of respondents may be explained by the average age of the participants, which was 15 years, corresponding to early to middle adolescence (Ernis et al., 2022). This developmental stage is characterized by significant physical changes associated with puberty, including redistribution of body fat, increases in height, and the development of secondary sexual characteristics. These changes often become sources of stress for adolescents, particularly when they perceive that their bodies do not align with prevailing societal standards of attractiveness (Mahesha et al., 2024).

According to Erik Erikson's psychosocial development theory, adolescents are in the stage of *identity versus role confusion*, during which they begin to form their personal identity, including their body image. At this stage, the influence of peers, social media, and social expectations becomes highly dominant, which may exacerbate dissatisfaction with one's body (Berzoff et al., 2016).

The assessment of stress levels using the Perceived Stress Scale (PSS-10) indicated that the majority of respondents were categorized as having moderate stress levels. This finding suggests that more than half of the respondents experienced significant psychological pressure, although it remained within a moderate range that still allowed them to manage stress through certain coping mechanisms. Meanwhile, 19.6% of respondents were categorized as experiencing high stress levels, indicating the presence of a group at greater risk for mental and physical health problems (American Psychological Association, 2023). High

levels of stress among adolescents may arise from various factors, including high academic demands, excessive assignments, poor examination results, and challenges within their social environment. The heavy academic workload at school can also contribute to stress among adolescents (American Psychological Association, 2023). The impact of such stress may disrupt adolescents' emotional stability, making them more prone to irritability, excessive anxiety, feelings of sadness, and even depression. Furthermore, prolonged stress may lead to serious psychological disorders, including anxiety disorders and depression (Aprilyani et al., 2023). This distribution may be explained by the characteristics of the respondents, whose average age was 15 years, corresponding to early to middle adolescence. This developmental period is widely recognized as a critical phase in psychological development, during which adolescents often face pressure from multiple sources, including academic demands, peer relationships, physical changes associated with puberty, and social expectations. Adolescents who lack adequate coping strategies are more vulnerable to experiencing higher levels of stress (Ernis et al., 2022; Aprilyani et al., 2023).

The results of the Spearman's rho analysis showed a correlation coefficient of -0.634 with a significance value of $p < 0.001$, indicating a negative relationship with a strong correlation between body image and stress levels (Latief, 2025). This means that the lower an individual's perception of their body image, the higher the level of stress they tend to experience, and vice versa. These findings are consistent with previous studies that also reported a significant association between stress and body image dissatisfaction among adolescents. Those studies concluded that adolescents with higher stress levels are more likely to feel dissatisfied with their bodies, which may ultimately trigger mental health problems such as anxiety and depression (Park & Woochul, 2020; Saputra & Wijayanti, 2023; Prasetyo & Lestari, 2024).

Recent international evidence further supports the findings of the present study. Swami et al. (2023) reported that adolescents with higher body appreciation consistently demonstrated better psychological well-being and lower psychological distress across different cultural settings. Likewise, recent studies conducted by Hewitt et al. (2024) and Demetriou et al. (2025) found that adolescents with negative body image were significantly more likely to experience stress, anxiety, and depressive symptoms because dissatisfaction with physical appearance reduced self-esteem and emotional resilience. Furthermore, appearance-focused social media exposure and frequent social comparison have been identified as important factors contributing to body dissatisfaction and psychological distress among adolescents. These findings indicate that the association between body image and stress observed in the present study is consistent with recent international evidence.

The relatively strong negative correlation observed in this study ($r = -0.634$) may be explained by the fact that body image and perceived stress share several common psychosocial determinants. During adolescence, rapid pubertal changes occur simultaneously with increasing peer comparison, academic pressure, family expectations, and exposure to idealized body standards through social media. These factors may simultaneously reduce body appreciation while increasing psychological distress, thereby strengthening the association between body image and perceived stress. Adolescents with positive body image generally possess greater self-acceptance, healthier coping strategies, and better emotional regulation, making them less vulnerable to stress. Conversely, adolescents with negative body image are more likely to experience body dissatisfaction, fear of negative evaluation, and lower self-esteem, all of which increase susceptibility to psychological stress.

Low body image is a psychological condition in which individuals hold negative perceptions regarding the shape, size, or appearance of their bodies, which often do not correspond to objective reality. Individuals with low body image tend to experience body dissatisfaction, feelings of unattractiveness, and excessive anxiety related to their appearance. This condition can be influenced by various psychological, social, cultural, and media-related factors (Grogan, 2021).

Low body image is also associated with psychological disturbances that affect the central nervous system and the endocrine system. Individuals with low body image often experience cognitive distortions

that lead to self-dissatisfaction, excessive fear regarding body appearance, and unfavorable social comparisons. From a neurobiological perspective, when individuals experience dissatisfaction with their bodies, the prefrontal cortex and the amygdala—brain regions involved in emotional regulation—may interpret this condition as a psychological threat. This process triggers the release of corticotropin-releasing hormone (CRH) by the hypothalamus, which stimulates the pituitary gland to secrete adrenocorticotrophic hormone (ACTH). ACTH subsequently stimulates the adrenal glands to produce cortisol, the primary hormone involved in the body's stress response (Palamarchuk et al., 2023).

Chronic elevation of cortisol levels may disrupt neurotransmitter function, particularly:

1. Serotonin → Decreases, which may contribute to anxiety and depression.
2. Dopamine → Decreases, reducing motivation and increasing the risk of eating disorders.
3. Norepinefrin → Increases, which may exacerbate anxiety and stress.

Furthermore, dissatisfaction with one's body may also lead to decreased sleep quality, which can disrupt hormonal balance and further worsen anxiety and stress. Social difficulties related to low body image, such as avoidance of social interactions or feelings of social rejection, may contribute to greater social isolation, which is a known risk factor for mood and anxiety disorders (Dondzilo & Basanovic, 2023). Overall, the pathophysiology of low body image involves complex interactions between the nervous system, endocrine system, and neurotransmitters, which may trigger a persistent stress cycle. This interaction can increase vulnerability to psychological disorders and contribute to elevated stress levels (Cash & Smolak, 2011).

he findings of this study have important implications for adolescent mental health promotion. Schools should integrate body image education and stress management into school health promotion programs. Guidance and counseling teachers should conduct early identification of students experiencing body dissatisfaction and provide appropriate counseling or referral services when necessary. Parents also play an essential role by fostering positive communication regarding body changes during adolescence and encouraging healthy lifestyle behaviors without emphasizing unrealistic beauty standards. In addition, family physicians and primary healthcare providers should consider incorporating body image assessment into routine adolescent mental health screening to facilitate early identification and intervention for adolescents at risk of psychological distress.

This study has several strengths. It involved both male and female adolescents and employed standardized instruments with good psychometric properties to assess body image and perceived stress. In addition, this study provides evidence regarding the relationship between body image and stress among students attending an Islamic senior high school, a population that remains underrepresented in previous research. Nevertheless, the findings should be interpreted in light of several limitations. The cross-sectional design precludes causal inference, while the use of self-administered questionnaires may introduce response bias. Furthermore, because the study was conducted at a single school, the findings may not be generalizable to all Indonesian adolescents. Future longitudinal studies involving multiple schools are recommended to confirm these findings

CONCLUSION

This study demonstrated a significant negative relationship between body image and stress levels among adolescents at Madrasah Aliyah Negeri 1 Medan. Adolescents with more positive body image tended to experience lower levels of perceived stress, whereas those with poorer body image were more likely to report higher stress levels. These findings indicate that body image is an important factor associated with adolescents' psychological well-being.

Future studies are recommended to employ longitudinal or multicenter designs involving more diverse adolescent populations to better clarify the causal relationship between body image and stress levels. Additionally, further research should explore other factors, such as social media use, family support, peer influence, and coping strategies, that may affect body image and psychological well-being among adolescents.

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