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Analysis of Nutritional Status, Reproductive Health Risk, and Psychological Distress among Senior High School Adolescents: A School-Based Cross-Sectional Study

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Abstract

Adolescence is a critical developmental period characterized by rapid biological, psychological, and social changes that may increase vulnerability to reproductive health problems and psychological distress. This study examined the relationships among nutritional status, reproductive health risks, and psychological distress among adolescents. A quantitative cross-sectional study was conducted among 198 senior high school students. Nutritional status was assessed using BMI-for-age anthropometric measurements, while reproductive health risk and psychological distress were measured using structured questionnaires, including the Kessler Psychological Distress Scale-10 (K10). Data were analyzed using univariate analysis, the Chi-Square test, Spearman's rank correlation, and linear regression. Most respondents had normal nutritional status (65.7%), moderate reproductive health risk (87.4%), and severe psychological distress (77.3%). Nutritional status was not significantly associated with reproductive health risk ($p = 0.9288$) or psychological distress ($p = 0.7764$). In contrast, reproductive health risk showed a significant association with psychological distress ($p < 0.001$; $\rho = 0.3939$). Multivariate analysis confirmed reproductive health risk as a significant predictor of psychological distress ($\beta = 0.829$; $p < 0.001$), explaining 15.4% of the variance. These findings highlight the importance of integrating reproductive health screening, counseling, and mental health support into school-based adolescent health programs.

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Introduction

Adolescence is a critical developmental stage marked by rapid physical, cognitive, social, and emotional changes. These changes increase adolescents' vulnerability to nutritional problems, reproductive health concerns, and psychological distress (Hapsari, 2019). In Indonesia, adolescent health remains a major

public health issue. The 2023 Indonesia Health Survey reported that undernutrition among adolescents aged 13–18 years ranged from 7.3% to 18%, while overweight and obesity ranged from 12% to 16.2% (Utami & Rialihanto, 2024). These findings indicate a double burden of malnutrition that may affect growth, body image, hormonal balance, and long-term health outcomes. Reproductive health is also an important concern during adolescence. Data from the 2018 Basic Health Research in Indonesia showed that 13.7% of women aged 10–59 years experienced irregular menstrual cycles within the previous year, with a prevalence of 16.4% among women aged 17–29 and 30–34 years. Psychological distress and mental stress were reported as contributing factors in 5.1% of cases (Amalia et al., 2023). However, adolescent reproductive health should not only be understood through menstrual problems, but also through reproductive discomfort, hygiene behavior, access to reproductive health information, and willingness to seek health services. Low reproductive health literacy among adolescents may increase risky behaviors and delay appropriate health-seeking practices (Rahman, 2022)

At the same time, psychological distress among adolescents has increased and become a growing public health concern. The Indonesian National Adolescent Mental Health Survey reported that approximately 15.5 million adolescents, or 34.9%, experienced mental health problems. Globally, one in seven adolescents aged 10–19 years experiences mental health problems (Kemenkes, 2024). Psychological distress among adolescents may be influenced by academic pressure, social relationships, body image concerns, family dynamics, and exposure to digital media (Karisma et al., 2023). The relationship among nutritional status, reproductive health, and psychological distress can be explained through a biopsychosocial perspective. Biologically, persistent psychological stress may disrupt hormonal regulation and reproductive function, including menstrual patterns (Maedy et al., 2022; Ranakusuma, 2017). Psychologically and behaviorally, distress may reduce healthy decision-making, increase risky reproductive behavior, and lower adherence to safe reproductive health practices (Devilawati, 2020; Panghiyangani, 2024; Rahayu et al., 2017). Distress may also influence nutritional status through unhealthy eating behaviors, including emotional eating, overeating, appetite loss, and restrictive eating patterns (Hanum, 2025; Multazami, 2022; Sadiah et al., 2025)

Although previous studies have examined adolescent nutrition, reproductive health, and mental health, these issues are often studied separately. Nutritional studies commonly focus on dietary patterns or body mass index, and reproductive health studies often emphasize knowledge or menstrual hygiene. In contrast, mental health studies usually focus on stress, anxiety, or social support. Limited studies have integrated nutritional status, reproductive health risk, and psychological distress within one analytical model, particularly among school-based adolescents. This gap limits understanding of whether reproductive health and nutritional status are both associated with psychological distress, and which factor has a stronger contribution. Therefore, this study aimed to analyze the relationships among nutritional status, reproductive health risk, and psychological distress among adolescents. This study contributes to the adolescent health literature by integrating the physical, reproductive, and psychological dimensions into a single model. The findings are expected to support the development of school-based early detection programs that combine nutritional assessment, reproductive health screening, and mental health support.

This study aims to analyze the relationships among nutritional status, reproductive health, and psychological distress in adolescents, providing a basis for developing early-detection interventions grounded in an integrated approach.

Materials and Methods

This study used a quantitative observational-analytical design with a cross-sectional approach. This design was selected to examine the relationship between nutritional status, reproductive health risk, and psychological distress among adolescents at a single point in time (Effendy, 2024). The study was conducted at SMA 7 Tangerang City in April 2026. The study population consisted of all students in grades 10, 11, and 12. The sample included 198 grade 11 students selected using purposive sampling. Grade 11 students were chosen because they were considered to have relatively stable physical and psychological development compared with grade 10 students and were not preparing for final examinations like grade 12 students. However, because purposive sampling was used, the findings should be interpreted within the context of grade 11 students in a school-based setting. They should not be generalized to all adolescents without caution.

The independent variables were nutritional status and reproductive health risk, while the dependent variable was psychological distress. Nutritional status was assessed through anthropometric measurements

of body weight and height, then classified using BMI-for-age into four categories: underweight, normal, overweight, and obese. The use of BMI-for-age classification is consistent with adolescent nutritional assessment, as nutritional status during adolescence reflects physical growth, body composition, and potential health risks (Utami & Rialihanto, 2024).

Reproductive health risk was measured using a structured questionnaire covering general reproductive health conditions, gender-specific reproductive complaints, and reproductive health service-seeking behavior. The total score was categorized into low, moderate, and high risk. This measurement was aligned with the concept that adolescent reproductive health includes not only biological complaints but also knowledge, hygiene behavior, access to information, and willingness to seek health services (Amalia et al., 2023; Rahman, 2022)

Psychological distress was measured using the Kessler Psychological Distress Scale-10 (K10), an adapted version that assesses distress symptoms over the previous 4 weeks. The total score was classified into four categories: normal, mild, moderate, and severe distress. The K10 has been used to assess psychological distress, including symptoms such as anxiety, restlessness, hopelessness, depressive feelings, and reduced emotional functioning (Azzahra, 2017; Karisma et al., 2023). Instrument validity was assessed through content review by experts in adolescent health, reproductive health, and public health to ensure item relevance, clarity, and appropriateness for adolescent respondents. The instrument was also pilot-tested with respondents with characteristics similar to those of the study sample. Reliability was assessed using Cronbach's alpha, with a value of ≥0.70 considered acceptable for internal consistency.

This study was conducted after obtaining administrative permission from the school. All respondents were informed of the study's purpose, the voluntary nature of participation, confidentiality, anonymity, and their right to withdraw at any time. Written informed consent was obtained prior to data collection. Because the study involved adolescent respondents and sensitive topics related to reproductive health and psychological distress, the ethical principles for research involving human participants were strictly applied throughout.

Data were analyzed using univariate, bivariate, and multivariate analyses. Univariate analysis was used to describe the frequency distribution of each variable. Bivariate analysis was performed using the Chi-Square test and Spearman's Rank correlation to examine associations among variables. Multivariate analysis was conducted using linear regression because psychological distress was analyzed using the total K10 score as a continuous outcome variable. Linear regression was considered appropriate to examine whether nutritional status and reproductive health risk predicted changes in psychological distress scores. Before regression analysis, the assumptions of linearity, independence of observations, normality of residuals, homoscedasticity, and absence of multicollinearity were assessed. Statistical significance was set at $\alpha = 0.05$

Results and Discussions

Result

Univariate Analysis

This analysis illustrates the frequency distribution of each research variable (n = 198).

Figure 1. *Nutritional Status Distribution*

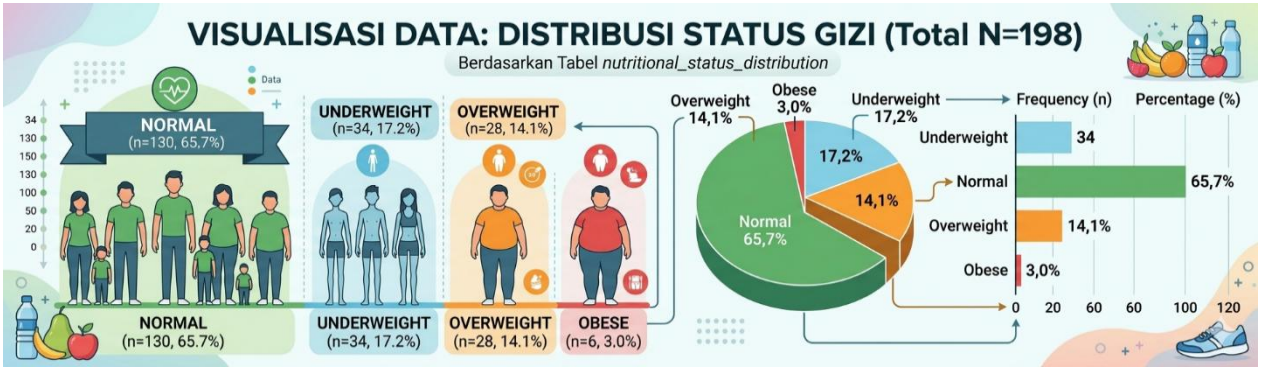

Figure 1 presents the distribution of nutritional status among 198 respondents. Most respondents were classified as having normal nutritional status, accounting for 65.7% of the sample. Meanwhile, 17.2% were categorized as underweight, 14.1% as overweight, and 3.0% as obese.

Figure 2. *Reproductive Health Risk Distribution*

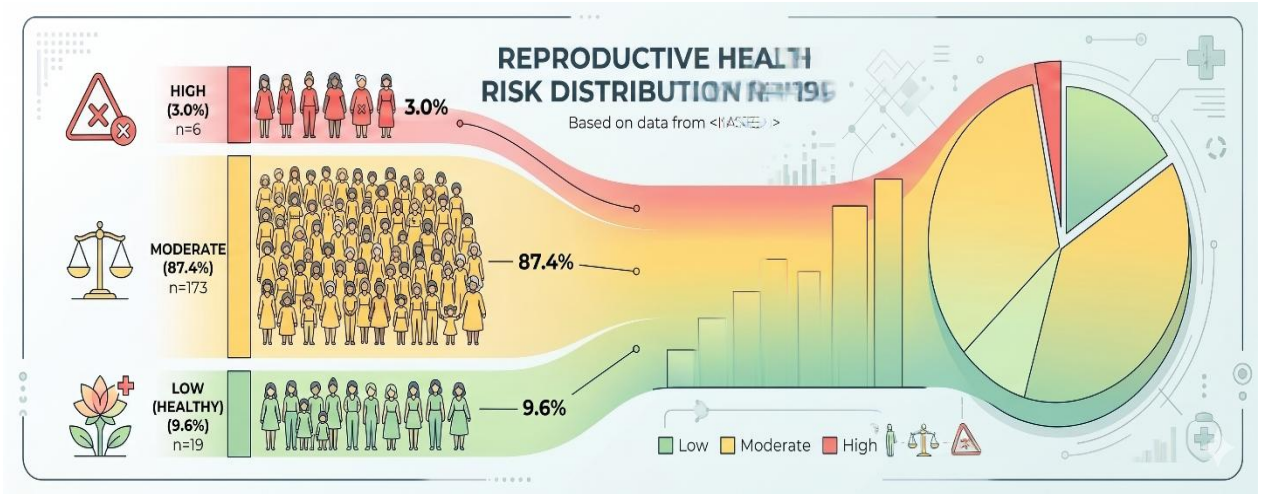

Figure 2 presents the distribution of reproductive health risk among 198 respondents. Most respondents were categorized as having moderate reproductive health risk, accounting for 87.4% of the sample (173 respondents). A smaller proportion of respondents were categorized as low risk/healthy, representing 9.6% (19 respondents). Meanwhile, only 3.0% or 6 respondents were classified as having a high reproductive health risk**.** These findings indicate that reproductive health risk among respondents was predominantly concentrated in the moderate-risk category, while the proportions of low-risk and high-risk respondents were relatively small.

Figure 3. *Psychological Distress Distribution*

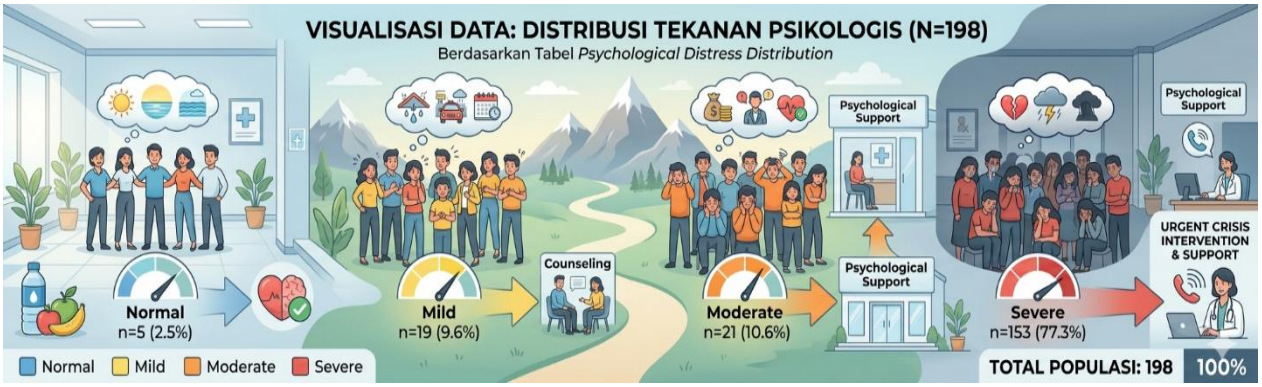

Figure 3 presents the distribution of psychological distress levels among 198 respondents. Severe psychological distress was the most frequent category, reported by 77.3% of respondents. moderate distress was reported by 10.6%, mild distress by 9.6%, and normal psychological status by 2.5%. Because psychological distress was measured using the K10 as a screening instrument, these categories represent self-reported psychological distress symptoms and should not be interpreted as clinical diagnoses.

Bivariate Analysis

Bivariate analysis was conducted using the Chi-Square test and Spearman's Rank correlation to examine the associations among nutritional status, reproductive health risk, and psychological distress.

Tabel 1
Correlation Analysis Between Nutritional Status, Reproductive Health, and Psychological Distress

Relationships Between Variables	P-Value (Chi-Square)	ρ (Spearman)	P-value (Spearman)	Notes
Nutrition vs. Reproductive Health	0.9288	0.0459	0.5204	Not Significant
Nutrition vs. Distress	0.764	0.0587	0.4110	Not Significant
Reproductive Health vs. Distress	< 0.001	0.3939	< 0.001	Significant
Significance level: $p < 0.05$				

The bivariate analysis showed no significant association between nutritional status and reproductive health risk, as assessed by the Chi-Square test and Spearman's Rank correlation. Nutritional status was also not significantly associated with psychological distress. In contrast, reproductive health risk was significantly associated with psychological distress, with a positive Spearman correlation coefficient indicating a moderate relationship.

Multivariate Analysis

Multivariate analysis was conducted using linear regression to examine the simultaneous contribution of nutritional status and reproductive health risk to psychological distress. Psychological distress was analyzed using the total K10 score as the outcome variable.

Regression Equation:

$Y = 1.832 + 0.094(X1) + 0.829(X2)$
Y = Psychological Distress
X1 = Nutritional Status
X2 = Reproductive Health Risk

Tabel 2
Regression Results Table

Independent Variables	Koefisien (B)	P-Value	Notes
Constants	1.832	<0.001	Significant
Nutritional Status (X1)	0.094	0.217	Not Significant
Reproductive Health Risk (X2)	0.829	0.000	Significant

$R^{=}$: 0.154
Dependent Variable: Psychological Distress
Significance level: $p < 0.05$

The regression results showed that reproductive health risk was significantly associated with psychological distress after being analyzed together with nutritional status. Nutritional status was not significantly associated with psychological distress in the regression model. The model explained 15.4% of the variance in psychological distress

Discussions

The findings of this study show that most respondents had normal nutritional status, while a smaller proportion were classified as underweight, overweight, or obese. Although nutritional status is commonly considered an important indicator of adolescent health, the bivariate analysis in this study showed no significant association between nutritional status and reproductive health risk or psychological distress. This finding suggests that anthropometric status, as measured by BMI-for-age, was not directly related to reproductive health risk or psychological distress in this sample

This result differs from several previous studies suggesting that nutritional problems may be associated with adolescent psychological conditions through dietary behavior, body image concerns, emotional eating, and social pressure. For example, Multazami (2022) reported that stress, eating patterns, and physical activity were associated with nutritional status among students, while Sadiah et al. (2025) highlighted the link between eating habits and nutritional status among adolescents. However, the non-significant finding in the present study may be explained by the fact that BMI-for-age only reflects anthropometric classification and does not capture dietary quality, micronutrient intake, body image dissatisfaction, emotional eating, or restrictive eating behavior. Therefore, nutritional status measured only by BMI-for-age may be insufficient to explain psychological distress among adolescents.

The absence of a significant association between nutritional status and reproductive health risk also requires careful interpretation. Some studies have shown that nutritional status and stress may be associated with menstrual cycle disturbances and reproductive function in adolescent girls (Handayani et al., 2022; Maedy et al., 2022). In contrast, the present study did not find a statistically significant relationship between nutritional status and reproductive health risk. This difference may be due to the broader measurement of reproductive health risk in this study, which included not only biological complaints but also reproductive health knowledge, behavioral aspects, and service-seeking behavior. Thus, reproductive health risk among adolescents may be influenced by other factors beyond nutritional status, such as reproductive health literacy, hygiene practices, access to information, comfort in seeking health services, and psychosocial conditions.

The results also showed that most respondents were categorized as having moderate reproductive health risk. This finding is consistent with previous evidence that adolescents often have a limited understanding of reproductive health, which may influence reproductive health behavior and access to appropriate information (Rahman, 2022). Studies on reproductive health promotion also emphasize that adolescents' reproductive health behavior is shaped by knowledge, access to health education, social environment, and the availability of youth-friendly information sources (Agustina et al., 2023; Rahayu et al., 2017). Therefore, the high proportion of respondents in the moderate-risk category may reflect the need for continuous reproductive health education in school-based settings.

Psychological distress was also found to be high among respondents, with severe distress being the most frequent category. This finding should be interpreted cautiously. The K10 is a screening instrument and does not provide a clinical diagnosis. Therefore, the high proportion of severe psychological distress in this study reflects self-reported distress symptoms rather than confirmed mental disorders. This result may be influenced by several contextual factors, including academic pressure, peer relationships, family conditions,

exposure to digital media, and the sensitivity of questions related to reproductive health. Previous studies have shown that adolescent mental health may be influenced by academic, social, and environmental factors (Rahmawaty et al., 2022; Karisma et al., 2023). Further assessment using clinical interviews or longitudinal follow-up would be needed to confirm the persistence and severity of distress symptoms

Bivariate analysis showed a significant positive correlation between reproductive health risk and psychological distress. This indicates that adolescents with higher reproductive health risk tended to report higher psychological distress. This finding is in line with studies showing that reproductive health problems, including menstrual disturbances and reproductive health concerns, may be associated with stress and emotional burden among adolescents (Amalia et al., 2023; Devilawati, 2020; Susanti, 2021). Psychological stress has also been reported to be related to hormonal balance and menstrual cycle patterns (Maedy et al., 2022; Ranakusuma, 2017). However, because this study used a cross-sectional design, the direction of the relationship cannot be determined.

The relationship between reproductive health risk and psychological distress should therefore be interpreted as an association, not as a causal effect. It cannot be concluded that reproductive health risk causes psychological distress. It is also possible that adolescents with higher psychological distress are more likely to perceive, experience, or report reproductive health complaints. This possible bidirectional relationship is supported by studies indicating that psychological distress may affect reproductive health function, while reproductive health problems may also contribute to emotional discomfort and anxiety (Devilawati, 2020; Handayani et al., 2022; Maedy et al., 2022). Longitudinal studies are needed to determine the temporal direction of this relationship.

In the multivariate analysis, reproductive health risk remained significantly associated with psychological distress, while nutritional status was not significant. The model explained 15.4% of the variance in psychological distress. This relatively modest explanatory value indicates that most of the variation in psychological distress was likely influenced by factors not included in this study. These may include academic stress, family environment, peer relationships, socioeconomic conditions, social media exposure, coping strategies, resilience, and previous mental health history. This interpretation is consistent with Azzahra (2017), who emphasized the role of resilience in psychological distress, and Rahmawaty et al. (2022), who reported that multiple social and environmental factors influence adolescent mental health.

These findings highlight the importance of integrating reproductive health education with mental health support in school-based adolescent health programs. However, the findings should not be interpreted as evidence that improving reproductive health alone will automatically reduce psychological distress. Rather, the results suggest that reproductive health risk is one factor associated with psychological distress and should be considered alongside other psychosocial determinants. School-based interventions may therefore include reproductive health literacy, counseling access, mental health screening, and referral pathways for adolescents who report reproductive health complaints or distress symptoms.

Overall, this study contributes to understanding adolescent health by examining nutritional status, reproductive health risks, and psychological distress within a single analytical model. The findings suggest that reproductive health risk was more closely associated with psychological distress than nutritional status in this sample. Nevertheless, due to the cross-sectional design, purposive sampling, and reliance on self-reported questionnaire data, the results should be interpreted with caution. They should not be generalized beyond similar school-based adolescent populations without further research.

Conclusion

This study showed that most adolescents had normal nutritional status; however, a substantial proportion also experienced moderate reproductive health risk and high levels of psychological distress. This finding suggests that adequate anthropometric status does not necessarily indicate optimal reproductive or psychological health among adolescents. Therefore, adolescent health assessment should not rely solely on nutritional indicators; it should also consider reproductive and mental health dimensions.

The bivariate and multivariate analyses showed that nutritional status was not significantly associated with psychological distress or reproductive health risk. This finding suggests that physical

condition, as measured by BMI-for-age, may not directly reflect adolescents' psychological or reproductive health status, which can also be influenced by behavioral, social, developmental, and environmental factors (Blakemore, S. J., & Mills, 2014; Sawyer, S. M., 2018). This result is also consistent with several studies in Indonesia, which indicate that nutritional status is not always the primary factor associated with adolescent mental health problems (Albin & Handayani, 2023; Rita & Sar, 2021).

In contrast, reproductive health risk was significantly associated with psychological distress, with a positive direction and moderate correlation strength. This indicates that adolescents with higher reproductive health risk tended to report higher psychological distress. These findings are consistent with global and national studies showing that reproductive health issues, including menstrual irregularities and low reproductive health literacy, are associated with stress, anxiety, and emotional burden among adolescents (Chandra-Mouli, V., 2019; Handayani et al., 2022). However, because this study used a cross-sectional design, this relationship should be interpreted as an association rather than a causal relationship

Psychological distress and reproductive health may have a bidirectional relationship. Distress may be related to hormonal and psychosocial factors that influence reproductive function, while reproductive health problems may also be associated with emotional discomfort and anxiety. Previous studies have suggested that limited understanding of reproductive health among adolescents may contribute to risky behaviors and psychological distress (Agustina et al., 2023). Nevertheless, the direction of this relationship cannot be confirmed in the present study.

The coefficient of determination showed that the model explained 15.4% of the variance in psychological distress. This indicates that nutritional status and reproductive health risk accounted for only a limited proportion of psychological distress among adolescents. Other factors, such as academic pressure, family environment, peer relationships, socioeconomic conditions, coping strategies, and digital media exposure, may have a larger role. This interpretation is supported by previous research in Indonesia that emphasizes the influence of social and academic environmental factors on adolescent mental health (Rahmawaty et al., 2022).

The findings of this study indicate that reproductive health risk was more closely associated with adolescent psychological distress than nutritional status in this sample. These results support the need for a more integrative school-based adolescent health approach that includes reproductive health education, mental health screening, access to counseling, and early detection systems. However, further longitudinal studies are needed to clarify the temporal and causal relationships among nutritional status, reproductive health risk, and psychological distress.

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