Vol. 8, No. 1, April 2026, pp 247-259
https://doi.org/10.36590/jika.v8i1.1804
http://salnesia.id/index.php/jika
jika@salnesia.id, p-ISSN: 2337-9847, e-ISSN: 2686-2883
Penerbit: Sarana Ilmu Indonesia (salnesia)

RESEARCH ARTICLES

Perilaku Makan, Asupan Energi, dan Kadar Hemoglobin dengan Status Gizi Mahasiswa Gizi

Dietary Patterns, Energy Intake, and Hemoglobin Levels with Nutritional Status Nutrition Students

Estu Ayu Ningsih[1*], Sugeng Eko Irianto[1], Bambang Setiaji[1], Endang Budiati[1], Dian Utama Pratiwi Putri[1]

[1]Departement of Health, Public Health Study Program, Postgraduate, Universitas Mitra Indonesia, Kota Bandar Lampung, Indonesia

Abstract

Nutritional status is an important indicator of students' health and productivity, particularly among nutrition students who are expected to have a good understanding of dietary patterns. This study aimed to determine the relationship between eating behavior, energy intake, and hemoglobin levels with nutritional status.This study used a quantitative approach with a cross-sectional design. The population consisted of 406 students from the Nutrition Department of Poltekkes Kemenkes Tanjungkarang, with a sample of 100 subjects selected using proportionate stratified random sampling. Data were collected using the DEBQ (Dutch Eating Behaviour Questionnaire) to assess eating behavior, a 2×24-hour dietary recall to measure energy intake, and hemoglobin level measurement using the finger prick method. Data were analyzed using Chi-square and multiple logistic regression. The multivariate model was statistically significant ($p < 0.001$, Nagelkerke R Square = 0.314). Energy intake and hemoglobin levels were significantly associated with nutritional status, where inadequate energy intake showed a higher prevalence ratio (PR) for abnormal nutritional status. Meanwhile, eating behavior was not a significant factor. The results showed that energy intake and hemoglobin levels were significantly associated with nutritional status. Students with inadequate energy intake were more likely to have abnormal nutritional status. Meanwhile, eating behavior was not significantly associated with nutritional status. Based on these findings, students are encouraged to improve emotional eating control and maintain balanced energy intake according to their nutritional needs to achieve optimal nutritional status.

Keywords: emotional eating, hemoglobin, nutritional status

Article history :

Submitted 25 November 2025
Accepted 17 April 2026
Published 30 April 2026

PUBLISHED BY:
Sarana Ilmu Indonesia (salnesia)
Address:
Jl. Dr. Ratulangi No. 75A, Baju Bodoa, Maros Baru, Kab. Maros, Provinsi Sulawesi Selatan, Indonesia

Email:
info@salnesia.id, jika@salnesia.id
Phone:
+62 85255155883

Abstrak

Status gizi merupakan indikator penting dalam menentukan kesehatan dan produktivitas mahasiswa, khususnya mahasiswa gizi yang diharapkan memiliki pemahaman yang baik mengenai pola makan. Penelitian ini bertujuan untuk mengetahui hubungan antara perilaku makan, asupan energi, dan kadar hemoglobin dengan status gizi. Penelitian ini menggunakan pendekatan kuantitatif dengan desain cross-sectional. Populasi penelitian terdiri dari 406 mahasiswa Jurusan Gizi Poltekkes Kemenkes Tanjungkarang, dengan jumlah sampel sebanyak 100 responden yang dipilih menggunakan teknik proportionate stratified random sampling. Pengumpulan data dilakukan menggunakan Dutch Eating Behaviour Questionnaire (DEBQ) untuk mengukur perilaku makan, formulir recall 2×24 jam untuk menilai asupan energi, serta pengukuran kadar hemoglobin dengan metode finger prick. Data dianalisis menggunakan Chi-square dan regresi logistik ganda. Model multivariat signifikan secara statistik (, Nagelkerke R Square). Asupan energi dan kadar hemoglobin berhubungan signifikan dengan status gizi, di mana asupan energi tidak adekuat menunjukkan rasio prevalensi (PR) yang lebih tinggi untuk status gizi tidak normal. Sementara itu, perilaku makan bukan merupakan faktor yang signifikan. Hasil penelitian menunjukkan bahwa asupan energi dan kadar hemoglobin berhubungan signifikan dengan status gizi. Mahasiswa dengan asupan energi yang tidak adekuat memiliki kemungkinan lebih tinggi untuk mengalami status gizi tidak normal. Sementara itu, perilaku makan tidak menunjukkan hubungan yang signifikan dengan status gizi. Berdasarkan temuan tersebut, mahasiswa disarankan untuk meningkatkan kontrol terhadap emotional eating serta menjaga keseimbangan asupan energi sesuai dengan kebutuhan tubuh guna mencapai status gizi yang optimal.

Kata kunci: *emotional eating, hemoglobin, status gizi*

*Correspondence Author:
Estu Ayu Ningsih, email: estu.ayuningsih@gmail.com

Highlight:

- Energy intake is significantly associated with students' nutritional status. Students who have an inadequate energy intake are more likely to experience an abnormal nutritional status.
- Along with energy intake, hemoglobin levels also demonstrate a statistically significant relationship with the nutritional status of the participants.
- In contrast to energy intake and hemoglobin levels, eating behavior (*eating behaviour*) was found to have no significant relationship with students' nutritional status.

INTRODUCTION

Nutrition is a key determinant of human resource quality. Nutritional problems remain one of the largest public health issues in Indonesia. Both undernutrition and overnutrition are common health problems among adults. Nutritional status is also one of the indicators used to determine whether a country can be classified as developed or developing. Students are individuals who have a status and affiliation with higher education institutions, such as universities, institutes, or academies, and are expected to

become future intellectuals (Permatasari Retno et al., 2021). An imbalance between the nutrients entering the body and the body's nutritional requirements for metabolism will affect nutritional status (Charina et al., 2022).

Eating behavior consists of three components: emotional eating, restrained eating, and external eating (Noerfitri and Aulia, 2022). Emotional eating refers to the urge to eat in response to negative emotions such as depression or hopelessness. Restrained eating is the cognitive effort to control food intake (Fathimatuzzahra et al., 2024), while external eating is triggered by external food stimuli such as sight, smell, and taste rather than hunger or fullness (Nurdiani et al., 2023). Emotional eating has become increasingly common among students experiencing academic and social pressure (Abadi et al., 2025). Many students turn to high calorie, low nutrient foods as a form of stress relief, which can worsen their nutritional status. In the student health context, nutritional status is a crucial aspect to monitor. Students often experience drastic dietary changes due to busy academic schedules, social pressures, and limited knowledge about balanced nutrition (Safitri et al., 2025). Research by previous research found that students frequently neglect proper nutrition, which can harm their physical and mental health (Amelia et al., 2024).

Energy intake is also a key factor influencing nutritional status (Kaluku et al., 2023). Foods containing carbohydrates, proteins, and fats are metabolized in the body to produce energy according to individual needs. An imbalance in energy intake can result in obesity or underweight conditions (Fitriyah and Setyaningtyas, 2021). Energy intake, measured in kilocalories, can be assessed using the 24 hour food recall method to record all foods and beverages consumed in the past 24 hours (Usman, 2023).Changes in nutritional status can be identified through Body Mass Index (BMI) measurements (Uni et al., 2022). BMI, calculated based on weight and height, serves as a screening tool to assess body composition. It categorizes individuals as underweight, normal weight, overweight, or obese. Variations in BMI may be influenced by factors such as stress and sleep quality (Gantarialdha, 2021). According to (Organization, 2021) the global prevalence figures for nutritional issues indicate that 39% of adults (aged over 18) are overweight. Based on the results of the 2023 Indonesian Health Survey, the prevalence of adolescents aged 13 to 15 years experiencing undernutrition reached 7.6% (1.9% were severely underweight and 5.7% were underweight), whilst 15.9% were overweight (12.1% were overweight and 3.8% were obese), meaning the percentage of adolescents with overweight status is higher than those with undernutrition. Similarly, the prevalence of undernutrition among adolescents aged 16–18 years in Indonesia is 8.3%, whilst the prevalence of overweight status is 11.7%. The prevalence of overweight among adolescents aged 16 to 18 in Lampung Province is 8.2%, whilst the prevalence of undernourishment is 7.3% (Kementrian Kesehatan, 2023).

Eating behavior shaped by emotional and environmental factors, daily energy intake adequacy, and hemoglobin levels as an indicator of anemia are important components influencing students' nutritional status. Based on a preliminary study conducted on 200 students in the Department of Nutrition at the Tanjungkarang Ministry of Health Polytechnic, 13.5% were severely underweight, 18% were underweight, 53.5% were normal, 7.5% were overweight, and 7.5% were obese.These findings indicate that nearly half of the students experience nutritional problems, highlighting a significant public health concern. The condition is particularly important among nutrition students, who are expected to have better knowledge and practices regarding healthy eating. Additionally, the demanding nature of vocational education, characterized by intensive practical sessions, academic workload, and organizational

activities, may influence students' eating behavior and nutritional status.

METHODS

This study used a quantitative approach with a cross-sectional design. The study population consisted of students from the Department of Nutrition at Poltekkes Kemenkes Tanjungkarang. This research was conducted in January–February 2025. The sample included 100 active students selected using proportionate stratified random sampling based on academic year strata and determined according to inclusion and exclusion criteria. Participants in this study were active students from the Nutrition Department at Poltekkes Kemenkes Tanjungkarang, specifically those in their first to third academic years, aged between 19 and 22 years, and willing to participate as subjects. Students were excluded from the study if they were absent during the data collection period, were undergoing a specific dietary program such as weight loss, or were menstruating at the time of the study.

This study utilised several instruments to collect data, including personal identification forms and measurement results from subjects to obtain data on characteristics, body weight, height, and nutritional status (BMI/U). Body weight was measured using digital scales with an accuracy of 0.1 kg, whilst height was measured using a stadiometer with an accuracy of 0.1 cm. Furthermore, subjects' eating behaviour was assessed using the Dutch Eating Behaviour Questionnaire (DEBQ) on a Likert scale, and energy intake data were obtained via a 2×24-hour food recall questionnaire (Niza et al., 2025). The interpretation of haemoglobin test results will refer to the 'Guideline on Haemoglobin Cutoffs to Define Anaemia in Individuals and Populations' (World Health Organization, 2024) as cited in the Ministry of Health, 2024, which defines low haemoglobin levels as the women aged 15–65 years: <12.0 g/dl an the Men aged 15–65 years: <13.0 g/dl (Kementrian Kesehatan Republik Indonesia, 2024).

Data analysis consisted of univariate analysis to describe respondent characteristics. Bivariate analysis was performed using the Chi-Square test to estimate the Prevalence Ratio (PR) with a 95% Confidence Interval (95% CI). Furthermore, multivariate analysis was conducted using Cox Regression to determine the adjusted PR and identify the factors most associated with nutritional status while controlling for potential confounders, with results presented along with 95% CI. The independent variables included eating behavior (emotional eating, restrained eating, and external eating), energy intake, and hemoglobin levels, while the dependent variable was nutritional status. This research has been approved and deemed ethically sound by the Tanjung Karang Public Health Polytechnic under the Ministry of Health, under reference number S.01/060/FKES05/2025.

RESULTS AND DISCUSSIONS

Results of univariate analysis

The majority of the 100 subjects exhibited a high level of external eating (96%) and a high level of restrained eating (70%), whereas emotional eating was predominantly low (62%), indicating that their eating behavior is highly driven by external cues and strict self-control rather than emotional triggers. Regarding physiological and nutritional indicators, more than half of the subjects had good energy intake (53%), normal hemoglobin levels (64%), and normal nutritional status (53%).

However, a substantial proportion of the population still demonstrated sub-optimal conditions, with 47% having low energy intake, 36% showing abnormal hemoglobin levels, and 47% presenting abnormal nutritional status, highlighting the need for targeted nutritional interventions.

Table 1. Distribution of responses based on variables tested

Variable	Category	n	%
Emotional eating	High	38	38
	Low	62	62
Reistrain eating	High	70	70
	Low	30	30
External eating	High	96	96
	Low	4	4
Energy intake data	Low	47	47
	Good	53	53
Hemoglobin level data	Abnormal	36	36
	Normal	64	64
Nutritional status data	Abnormal	47	47
	Normal	53	53
Total		**100**	**100**

Source: Primary data, 2025

Results of bivariate analysis

The results of the analysis of the relationship between emotional eating, restrained eating, external eating, Energy Intake, and Haemoglobin level with the nutritional status of students can be seen in the following Table 2

Table 2. Result of bivariate analysis

Variable	Nutritional Status				Total		*p-value*
	Normal		Abnormal				
	n	%	n	%	n	%	
Emotional Eating							
Low	37	59,7	25	40,3	62	100,0	0,133
High	16	42,1	22	57,9	38	100,0	
Reinstrant Eating							
Low	16	53,3	14	46,7	30	100,0	1,0
High	37	52,9	33	47,1	70	100,0	
External Eating							
Low	2	50,0	2	50,0	4	100,0	1,0
High	51	53,1	45	46,9	96	100,0	
Energy Intake							
Good	39	73,6	14	26,4	6,566	100,0	1,0
Bad	14	29,8	33	70,2	47	100,0	
Energy Intake							
Normal	42	65,6	22	34,4	4,339	100,0	1,0
Abnormal	11	30,6	25	69,4	36	100,0	

Note: *Chi-square test, significant if p-value < 0.05

Based on Table no 2 Most students had a low level of emotional eating (62%).

Among subjects with low emotional eating, 25 students (40.3%) had abnormal nutritional status, while 37 students (59.7%) had normal nutritional status. In the group with high emotional eating, of the 38 subjects, 22 students (57.9%) had abnormal nutritional status, and 16 students (42.1%) had normal nutritional status. Statistical analysis showed no significant relationship between emotional eating level and students' nutritional status, with a *p-value* of 0.133 ($p > 0.05$). This indicates that emotional eating levels did not significantly affect the nutritional status of subjects in this study.

Theoretically, emotional eating is defined as an eating behavior triggered by negative emotional states such as stress, anxiety, loneliness, or frustration, rather than by physiological hunger. Individuals who experience emotional eating tend to choose high-calorie, highsugar, or high-fat foods as a form of escape from negative emotions. Therefore, conceptually, emotional eating is often associated with weight gain and an increased risk of overweight or obesity (Sukianto et al., 2020).

However, the absence of a significant relationship in this study may be attributed to several factors. First, nutrition students generally possess relatively better knowledge regarding balanced nutrition principles and healthy eating patterns. This knowledge may act as a protective factor against the negative effects of emotional eating. Although they may experience emotional urges to eat, they might still be able to control the type and amount of food consumed.

Another factor to consider is the possibility that students with emotional eating tendencies compensate through adequate physical activity or by restricting calorie intake at other times, thereby preventing excessive energy accumulation. Several studies have also indicated that the relationship between emotional eating and nutritional status can be influenced by mediating variables such as self control, sleep patterns, physical activity, and social support.

The findings of this study showed that there was no significant relationship between emotional eating and students' nutritional status (p-value = 0.133). This can be explained, in part, by the presence of compensatory behaviors among subjects. Compensatory behavior is a self-regulation strategy regarding energy intake, in which individuals attempt to balance overeating by reducing food intake at another time or increasing physical activity to maintain body weight (Indriasari, 2020). In this context, although subjects might have a tendency toward emotional eating, they may balance their total energy intake by limiting food consumption the following day or by paying more attention to their food choices, thus preventing a direct impact on their nutritional status.

Most subjects fell into the category of high restraint eating, namely 70% (n=70). Of this group, 33 subjects (32.9%) had abnormal nutritional status and 37 subjects (37.1%) had normal nutritional status. Meanwhile, in the low eating restraint group, 14 subjects (14.1%) had abnormal nutritional status and 16 subjects (15.9%) had normal nutritional status.The results of the chi-square statistical test showed that there was no significant relationship between eating restraint and the nutritional status of students, with a p-value of 1.000 ($p > 0.05$). This indicates that the level of desire to restrict food intake did not significantly affect the nutritional status of students in this study.

Restraint eating refers to an eating behavior characterized by an individual's conscious effort to control and restrict food intake, usually with the goal of maintaining or reducing body weight (Nurdiani et al., 2023). However, various studies have shown that cognitive food restriction does not always produce positive nutritional outcomes. On the contrary, in some cases, restrained eaters tend to experience episodes of

overeating or binge eating when self-control is disrupted, such as during stressful or emotionally charged situations (Fathimatuzzahra et al., 2024).

In the context of this study, the non-significant relationship between restraint eating and nutritional status can be explained by the possibility that the intention to restrict food intake does not necessarily translate into consistent eating behavior. In other words, students with high restraint eating scores may not actually succeed in reducing their calorie intake, resulting in no noticeable difference in nutritional status compared to those with moderate restraint eating levels. This finding aligns with (Tondeur et al., 2008) who stated that restraint behavior is often ineffective in the long term, as it can easily be disrupted by emotional or social factors.

Furthermore, as nutrition students, the study participants likely possess good nutritional knowledge, which prevents them from engaging in extreme or nutritionally harmful food restrictions. Such knowledge may serve as a protective factor in maintaining nutritional status, even among those who have the intention to limit food intake (Aulia, 2021). In this study, the lack of a significant relationship between restraint eating and nutritional status may be explained by two possibilities. First, the students' adequate nutritional knowledge may result in their restraint eating being moderate and rational rather than extreme. Second, the dietary restriction practiced might not be effective in terms of total energy intake meaning that even if they believe they are restricting their food consumption, their intake may still exceed daily energy requirements, especially if not balanced with sufficient physical activity.

This finding is consistent with a study conducted by (Ainun et al., 2021) at Hasanuddin University, which also found no significant association between restraint eating behavior and students' nutritional status ($p > 0.05$). Similarly, research by (Prasetya, 2021) reported that students often adopt restraint eating for only a short period, without accompanying comprehensive lifestyle changes, resulting in no significant impact on BMI (Nurdiani et al., 2023).

According to Green & Kreuter's (2005) PRECEDE model, restraint eating falls under predisposing factors representing an individual's intention and belief in controlling body weight. However, without the support of enabling factors such as access to healthy foods and social support, this intention will not lead to effective behavioral changes (Nurwahidah, 2025). Therefore, restraint eating as a self directed attempt to limit food intake does not guarantee improvement in nutritional status unless it is carried out consistently, systematically, and combined with other healthy behaviors such as regular physical activity and emotional awareness.

The majority of students had high external eating scores. Among this group, 45 subjects (46.9%) had abnormal nutritional status, while 51 subjects (53.1%) had normal nutritional status. Meanwhile, four subjects were classified as having low external eating, with two (50.0%) having abnormal nutritional status and two (50.0%) having normal nutritional status. This distribution shows that the proportion of students with high external eating was almost evenly distributed between the normal and abnormal nutritional status groups. This finding is supported by the chi-square test results, which yielded a p-value of 1.000, far above the significance threshold ($p > 0.05$). Therefore, there was no significant relationship between external eating behavior and students' nutritional status.

External eating behavior refers to an individual's tendency to eat in response to external stimuli such as the appearance, aroma, or presence of food, or social situations rather than due to physiological hunger. Individuals with high levels of external eating are more likely to be tempted by food that looks appealing or appetizing, even when

they are not actually hungry. However, such responses do not always lead to excessive energy intake that affects nutritional status, as they still depend on factors such as the frequency and type of food consumed, as well as the individual's physical activity and metabolism.

These findings are consistent which also found no significant relationship between external eating and students' nutritional status. The study noted that although many subjects had high external eating scores, most still maintained normal nutritional status because they were able to control portion sizes or compensate through sufficient physical activity (Usman, 2023). Additionally, environmental factors within the campus such as the availability of nutritious food options in the cafeteria or the habit of bringing homemade meals also influence students' daily energy intake.

Of the 53 subjects with adequate energy intake, most (73.6%) had normal nutritional status, while 26.4% had abnormal status. Conversely, among 47 subjects with inadequate energy intake, the majority (70.2%) had abnormal nutritional status, and only 29.8% had normal status.

The Chi-square analysis demonstrated that energy intake was significantly associated with nutritional status ($p < 0.001$), with students having inadequate energy intake showing a higher likelihood of abnormal nutritional status (PR = 2.66). Similarly, hemoglobin level was significantly associated with nutritional status ($p = 0.002$). Students with low hemoglobin levels had approximately twice the prevalence of abnormal nutritional status compared to those with normal hemoglobin levels (PR = 2.02).

Energy intake refers to the amount of energy obtained by the body from food and beverages to meet the needs of basal metabolism, physical activity, and growth. When energy intake is lower than the body's requirements, the body will utilize stored energy reserves in the form of fat or other body tissues. Over time, this can lead to weight loss and a decline in nutritional status (Fitriani, 2020). Long-term energy imbalance affects body composition and ultimately impacts nutritional status, either toward undernutrition or overnutrition (Alimuddin et al., 2024). If energy intake is too low, body weight may fall below normal levels, increasing the risk of undernutrition. Conversely, if energy intake consistently exceeds the body's needs, the risk of overweight and obesity increases.

Furthermore, energy requirements are influenced by factors such as age, sex, physical activity, and physiological condition. Students engaged in demanding activities such as lectures, practicums, fieldwork, and organizational commitments require adequate energy to perform optimally. Emphasized the importance of adjusting energy intake to physical activity levels in order to prevent energy imbalances that may lead to nutritional problems (Durry et al., 2024). Previous research by Poietry et al. (2020) supports these findings, showing that students with insufficient energy intake tend to have poorer nutritional status. This highlights the need for nutrition interventions aimed at improving students' dietary habits to include regular monitoring of daily energy intake (Poetry et al., 2020).

Hemoglobin levels can be categorized as reinforcing factors internal physiological factors that strengthen an individual's motivation or ability to engage in healthy behaviors (Fathiyah et al., 2025). Optimal hemoglobin levels reflect a healthy physical condition that enables sufficient energy, good appetite, and normal metabolic capacity all of which are essential in maintaining good nutritional status (Sastri Rukmana and Adnan Hudain, 2024). Therefore, efforts to improve students' nutritional status should not focus solely on enhancing energy or macronutrient intake, but also include regular

monitoring of hemoglobin levels and micronutrient interventions such as education on the consumption of iron, vitamin C, and a balanced nutritious diet. A decrease in haemoglobin levels can contribute to malnutrition, as the body is unable to function optimally in absorbing and utilising iron. Inadequate haemoglobin levels are often caused by low iron intake, malabsorption, or chronic blood loss (Damayanti et al., 2025).

Multivariate results

From the Table 3, two variables restrained eating and external eating were excluded from the multivariate analysis. The variables included in the first-stage modeling were emotional eating, energy intake, and hemoglobin levels. Variables with a p-value < 0.25 in the bivariate analysis were selected as candidates for the multivariate model. Emotional eating (p=0.087) was included alongside energy intake and hemoglobin levels because of its theoretical importance and its p-value being below the 0.25 threshold According to previous research, there is a correlation between stress levels and emotional eating behaviour among final-year students at Universitas Negeri semarang (Rohmah, 2022). Another study has revealed a link between dietary patterns and haemoglobin levels among female students at the Faculty of Health Sciences, Muhammadiyah University of Gresik (Hikmah et al., 2023).

Table 3. Variable candidate selection

Variable	p-value	Multivariate Candidate
Emotional eating	0,087*	Yes
Reinstraint eating	0,965	No
External eating	0,902	No
Energy intake	0,000*	Yes
Hemoglobin level	0,001*	Yes

Note: *p-value calculated using Chi-square test; *p < 0.25 was used as the entry threshold for multivariate candidate selection*

Based on Table 4, in the first-stage multivariate model, the variable with the highest p-value (p > 0.05) was hemoglobin level (p = 0.106). Therefore, hemoglobin level was the first variable to be removed from the model. The findings are consistent with those of previous researchers, showing a significant association between energy intake and nutritional status among students living in rented accommodation in Ngaliyan Sub-district (p-value = <0.001), There is a correlation between emotional eating and nutritional status among students living in shared accommodation in Ngaliyan Sub-district (p-value = 0.004) (Usman, 2023).

Table 4. Full multivariate model of nutritional status associated factors (Phase I)

Variable	df	p-value	PR (95% CI)
Emotional eating	1	0,044	2,671
Energy intake	1	0,001	5,459
Hemoglobin level	1	0,106	2,297

Note: *PR = Prevalence Ratio; CI = Confidence Interval. p-value and PR were calculated using Cox Regression

The interaction test was conducted on the significant variables, namely emotional eating and energy intake. Based on Table 5, the multivariate interaction model showed

no interaction between energy intake and emotional eating, as the p-value was greater than 0.05.

Table 5. Stepwise model of associated factors

Variable	df	p-value	PR (95% CI)
Emotional eating	1	0,041*	2,682
Energy intake	1	<0,001*	7,521

Note: *PR = Prevalence Ratio; CI = Confidence Interval. p-value and PR were calculated using Cox Regression

According to Table 6, the energy intake variable plays the most dominant role in this model. This finding is consistent with the Indonesian literature, which indicates that an unbalanced energy intake whether a deficiency or an excess is directly linked to nutritional status, such as being underweight or overweight. Energy requirements that are not aligned with physical activity lead to energy imbalance and directly affect body mass index, a finding also supported by research on students at the collage (Amelia et al., 2025).

Table 6. Interaction analysis of associated factors

Variable	df	p-value	PR (95% CI)
Emotional eating	1	0,044*	2,671
Energy intake	1	0,001*	5,459
Hemoglobin level	1	0,106	2,297
Energy Intake through Emotional Eating	1	0,065	5,985

Note: *PR = Prevalence Ratio; CI = Confidence Interval. p-value and PR were calculated using Cox Regression

Interestingly, haemoglobin levels, which were initially included as a control variable, were not significant in the final model (p = 0.106). Differences in results between bivariate and multivariate tests regarding the relationship between haemoglobin levels and nutritional status are common in multivariate statistical analysis. In the bivariate test (chi-square), a significant association was found between haemoglobin levels and nutritional status (p = 0.002), but when tested When considered alongside other variables (emotional eating and energy intake), haemoglobin levels no longer showed a significant association (p = 0.106). This difference indicates a conflict between independent variables or a relatively weaker contribution compared to other variables in the model.

Scientifically, this difference can be explained through the concepts of confounding and interaction between variables. In bivariate tests, the analysis only assesses the direct relationship between two variables without considering the influence of other variables. Meanwhile, multivariate tests taking all independent variables into account simultaneously. In this context, when energy intake is included in the model, the effect of haemoglobin levels becomes insignificant, as there is likely to be an overlap in the effects of the two variables, with energy intake playing a more dominant role in explaining nutritional status. Haemoglobin levels do not always reflect overall nutritional status; rather, they are more specific indicators of iron status or anaemia. Students may have low haemoglobin levels but still be in a normal nutritional state if their energy and macronutrient intake is sufficient. Anaemia can be influenced by other

factors such as menstruation, worm infections, or chronic diseases, not just nutritional status or dietary patterns (Astuti and Kulsum, 2020).These findings suggest that haemoglobin levels, whilst indicating adequate iron status, are not sufficiently robust to explain students' nutritional status. Stating that many students experience energy or macronutrient deficiencies but do not exhibit anaemia thanks to adequate micronutrient intake and healthy lifestyles . Therefore, it is important to monitor eating behaviour and energy sufficiency in nutritional intervention programmes among students. Interventions should not only focus on increasing haemoglobin levels or supplementation, but also on managing emotional stress that triggers 'emotional eating' and providing education on appropriate energy intake. With this approach, improvements in nutritional status can be achieved more comprehensively and effectively among productive age groups such as students.

CONCLUSIONS

The results of this study showed that emotional eating and energy intake were significantly associated with students' nutritional status, while hemoglobin levels were not significantly associated in the multivariate analysis. These findings highlight the importance of monitoring eating behavior and ensuring adequate energy intake in nutrition intervention programs among university students. To support the stability of eating behavior and energy adequacy among Nutrition Department students at Poltekkes Kemenkes Tanjungkarang, educational interventions such as seminars and training on healthy eating patterns based on psychological approaches are recommended. These interventions have the potential to positively influence students' habits and behaviors. This study can serve as a basis for developing appropriate policies and designing more responsive health programs tailored to students' needs, with adjustments to institutional regulations.

REFERENCES

Abadi, A.R., Septianingtyas, Aini, D.K., 2025. Stres Akademik Sebagai Pemicu Emotional Eating Pada Mahasiswa. J. Psikol. Poseidon 8, 43–55. Https://Doi.Org/10.30649/Jpp.V8i1.135

Ainun, N.R., Mannyullei, S., Amqam, H., 2021. Hasanuddin Journal Of Public Health. Hasanuddin J. Public Heal. 3, 99–114.

Amelia, A.S., Putri, D., Desriyanti, E., Hendrizal, M., Sakinah, Khairati, S., 2024. Eksplorasi Pola Makan Sehat Dan Dampaknya Terhadap Konsentrasi Belajar Mahasiswa Pendidikan Guru Madrasah Ibtidaiyah (Pgmi). Interdisiplin J. Qual. Quant. Res. 1, 329–337.

Amelia, R., Mardiyah, S., Wijayanti, W., 2025. Hubungan Pola Makan, Tingkat Stres, Dan Durasi Tidur Dengan Status Gizi Pada Mahasiswa Tingkat Akhir. J. Gizi Dan Kesehat. 17, 67–77.

Astuti, D., Kulsum, U., 2020. Pola Menstruasi Dengan Terjadinya Anemia Pada Remaja. J. Ilmu Keperawatan Dan Kebidanan 11, 314–327.

Aulia, N.R., 2021. Peran Pengetahuan Gizi Terhadap Asupan Energi, Status Gizi Dan Sikap Tentang Gizi Remaja. J. Ilm. Gizi Dan Kesehat. 2, 31–35. Https://Doi.Org/10.46772/Jigk.V2i02.454

Ayu Cahyaning Alam, R., Reski Amalia, M., Tau, L.N., 2024. Riwayat Kelahiran Dan Komposisi Tubuh Ibu Kaitannya Dengan Status Gizi Balita Birth History And

Maternal Body Composition Related To Nutritional Status In Toddlers.
Charina, M.S., Sagita, S., Koamesah, S.M.J., Woda, R.R., 2022. Hubungan Pengetahuan Gizi Dan Pola Konsumsi Dengan Status Gizi Pada Mahasiswa Fakultas Kedokteran Universitas Nusa Cendana. Cendana Med. J. 10, 197–204. Https://Doi.Org/10.35508/Cmj.V10i1.6829
Damayanti, R., Rochmawati, Mutika, Winnie Tunggal, 2025. K E S E H A T An Analisis Hubungan Status Gizi Berdasarkan Nilai Indeks Masa Tubuh Terhadap Kadar Hemoglobin Pada Remaja Putri . Program Studi Kebidanan Dan Pendidikan Profesi Bidan Universitas Gunadarma Abstrak Bertujuan Untuk Mengevaluasi Korelasi Antar. Prima J. Ilm. Ilmu Kesehat. 007, 216–221.
Durry, F.D., Zahira, A.S., Satyafebrianti, K.C., Agustina, P.N., Arbani, R. A., & Seliana, I., 2024. Peran Status Gizi Terhadap Aktivitas Fisik, Prestasi Belajar Dan Body Image Mahasiswa Di Indonesia. Tinj. Lit. Pros. Semin. Nas. Kusuma 2, 393–407.
Fathimatuzzahra, N., Nurhamidi, Yanti, R., 2024. Hubungan Perilaku Emotional Eating, Restraint Eating, Dan Tingkat Stres Dengan Status Gizi Remaja Relationship Of Emotional Eating, Restraint Eating, And Stress Levels With Nutrition Status Of Adolescents. J. Ris. Pangan Dan Gizi 06, 159–166.
Fitriani, R., 2020. Hubungan Antara Pengetahuan Gizi Seimbang, Citra Tubuh, Tingkat Kecukupan Energi Dan Zat Gizi Makro Dengan Status Gizi Pada Siswa Sma Negeri 86 Jakarta. J. Heal. Sci. Gorontalo J. Heal. Sci. Community 4, 29–38. Https://Doi.Org/10.35971/Gojhes.V4i1.5041
Fitriyah, N., Setyaningtyas, S.W., 2021. Hubungan Asupan Energi, Makronutrien, Zink Dan Fe Dengan Underweight Pada Ibu Dan Balita Di Desa Suwari Bawean, Gresik. Media Gizi Kesmas 10, 56. Https://Doi.Org/10.20473/Mgk.V10i1.2021.56-62
Gantarialdha, N., 2021. Hubungan Indeks Massa Tubuh Terhadap Ketahanan Kardiorespirasi Dinyatakan Dalam Vo2max. J. Med. Hutama 02, 1162–1168.
Hikmah, Y., Supriatiningrum, D.N., Rahma, A., 2023. Hubungan Pola Makan, Status, Dan Terhadap, Gizi. Ghidza Media J. 4, 161–176.
Indriasari, Y.K.N.J.R., 2020. Perilaku Dan Pendidikan Gizi Pada Remaja Pbesitas.
Kaluku, K., Junieni, Mahmud, N, R., 2023. Faktor Yang Mempengaruhi Kebiasaan Ngemil Terhadap Prestasi Belajar Dan Status Gizi (Studi Literatur). Glob. Heal. Sci. 8, 69–74.
Kementrian Kesehatan, 2023. Profil Kesehatan Indonesia 2023.
Kementrian Kesehatan Republik Indonesia, 2024. Profil Kesehatan Profil Kesehatan 2024, Buku.
Niza, T.F., Puspitasari, D.I., Firmansyah, 2025. Hubungan Kejadian Stres Dan Kejadian Emotional Eating Dengan Status Gizi Pada Remaja Sma Di Kecamatan Banjarsari Surakarta. Sehat Rakyat J. Kesehat. Masy. 4, 1112–1121. Https://Doi.Org/10.54259/Sehatrakyat.V4i4.5961
Noerfitri, Aulia, P.A., 2022. Perilaku Makan Dan Kejadian Gizi Lebih Pada Mahasiswa Stikes Mitra Keluarga. J. Penelit. Kesehat. Suara Forikes 12, 94–99.
Nurdiani, R., Rahman, N.A. Syifa, Madanijah, S., 2023. Perilaku Makan Tipe Emotional, External Dan Restrained Kaitannya Dengan Indeks Massa Tubuh Mahasiswa. J. Ilmu Gizi Dan Diet. 2, 59–65. Https://Doi.Org/10.25182/Jigd.2023.2.1.59-65
Nurwahidah, N., 2025. Analisis Faktor Predisposing, Enabling Dan Reinforcing Dengan Pelaksanaan Peran Kader Dalam Pencegahan Stunting Di Wilayah Kabupaten

Lombok Tengah. Maras J. Penelit. Multidisiplin 3, 43–54. Https://Doi.Org/10.60126/Maras.V3i1.680

Organization, World Health, 2021. World Health Statics 2021 Monitoring Health For The Sdgs.

Permatasari Retno, Miftahul, A., Raup, P., 2021. Studi Deskriptif Dampak Psikologis Mahasiswa Program Studi Bimbingan Dan Konseling Universitas Pgri Banyuwangi Dalam Penyusunan Skripsi Di Masa Pandemi Covid-19. J. Bina Ilmu Cendekia 2, 127–141.

Poetry, M.A., Nindya, T.S., Buanasita, A., 2020. Perbedaan Konsumsi Energi Dan Zat Gizi Makro Berdasarkan Status Gizi Mahasiswa Fakultas Kesehatan Masyarakat Universitas Airlangga
<I>[Diff Erence Of Energy And Macronutrients Consumption Based On Nutritional Status Among Student Of Faculty Of Public H. Media Gizi Indones. 15, 52. Https://Doi.Org/10.20473/Mgi.V15i1.52-59

Prasetya, S.E., 2021. Pengaruh Media Cakram Gizi Seimbang Terhadap Tingkat Pengetahuan Dan Sikap Remaja Putri Di Smp Negeri 2 Banyuglugur. Harena J. Gizi 3, 113–119.

Rohmah, N., 2022. Stres Dan Perilaku Emotional Eating Pada Mahasiswa Stress And Emotional Eating Behavior In Students Of Universitas Negeri Semarang. Nutr. (Nutrition Res. Dev. Journal) 02, 10–18.

Safitri, A., Tania, A., Lufvita, D., Purba, S., Rahmawati, I., Rahmasari, P., Idiano, D.H., Aidha, Z., Islam, U., Sumatera, N., Masyarakat, F.K., Makanan, F., 2025. Gambaran Perilaku Pola Makan Tidak Teratur Pda Mahasiswa Universitas Islam Negeri Sumatera Utara 4, 116–126.

Sastri Rukmana, A., Adnan Hudain, M., 2024. Analisis Status Gizi, Dan Kadar Hemoglobin Darah Terhadap Tingkat Kebugaran Jasmani Siswa Sma Negeri 6 Makassar. Joker (Jurnal Ilmu Keolahragaan 5, 2723–584.

Siti Fathiyah, N., Novita, A., 2025. Hubungan Kadar Hemoglobin Terhadap Kebugaran Jasmani Pada Siswa Sman 9 Depok Tahun 2024 The Relationship Between Hemoglobin Levels And Physical Fitness In Students Of Sman 9 Depok In 2024. J. Intelek Insa. Cendikia 7423–7432.

Sukianto, R.E., Marjan, A.Q., Fauziyah, A., 2020. Hubungan Tingkat Stres, Emotional Eating, Aktivitas Fisik, Dan Persen Lemak Tubuh Dengan Status Gizi Pegawai Universitas Pembangunan Nasional Jakarta. Ilmu Gizi Indones. 3, 113. Https://Doi.Org/10.35842/Ilgi.V3i2.135

Tondeur, J., Hermans, R., Braak, Johan Van, Valcke, M., 2008. Exploring The Link Between Teachers' Educational Belief Profiles And Different Types Of Computer Use In The Classroom. Baltasar Fernandez-Manjon Complut. Univ. Madrid Atos Orig. Res. Innov. 24, 2541–2553.

Uni, J., Akhfar, K., Arfi, A., Khaera, N., 2022. Hubungan Indeks Massa Tubuh (Imt) Dengan Kejadian Dismenorea Di Kabupaten Bulukumba. Jmns 4, 39–45. Https://Doi.Org/10.57170/Jmns.V4i1.86

Usman, A.T., 2023. Hubungan Pengetahuan Gizi, Asupan Energi, Dan Emotional Eating Dengan Status Gizi Pada Mahasiswa Yang Indekos Di Kelurahan Ngaliyan Skripsi. Univ. Islam Negeri Walisongo Semarang.

World Health Organization, 2024. World Health Statistics 2024 Monitoring Health For The Sdgs, Sustainable Development Goals.