Relationship between Nutrition Knowledge and Physical Activity with the Nutritional Status of Adolescents at SMP Negeri 2 Jogorogo, Ngawi Regency

Najwa Laska Halqi[1], Esti Novi Andyarini[2], Sarita Oktorina[3]
[123]Fakultas Psikologi dan Kesehatan, UIN Sunan Ampel Surabaya
laskanajwa@gmail.com,

Keywords: *Nutrition Knowledge, Physical Activity, Nutritional Status*

Abstract: Adolescence is a transitional period characterized by accelerated physical growth and psychosocial changes, resulting in increased nutritional needs. Although the majority of adolescents have normal nutritional status, the prevalence of overnutrition is still quite high. One factor that can be related to nutritional status is nutritional knowledge and physical activity. This study aims to determine the relationship between nutritional knowledge and physical activity with nutritional status in ninth-grade adolescents at SMP Negeri 2 Jogorogo, Ngawi Regency. This study used a quantitative method with a correlational analytical approach and a cross-sectional design. The study population was all 30 ninth-grade students selected using a total sampling technique. The independent variables were nutritional knowledge and physical activity, while the dependent variable was nutritional status measured using the Body Mass Index for Age (BMI/U). Data were obtained through questionnaires and anthropometric measurements, then analyzed using the Chi-Square test and ordinal logistic regression with a significance level of 0.05. The results showed that the majority of respondents had good nutritional knowledge (80%), heavy physical activity (53.3%), and normal nutritional status (76.6%). However, the ordinal regression test results obtained a significance value of 0.612 ($p > 0.05$) and a McFadden's Pseudo R^2 of 0.026. This indicates that nutrition knowledge and physical activity are not significantly related to adolescent nutritional status, with an explanatory contribution of only 2.6%. Nutrition interventions for adolescents need to be implemented comprehensively, taking these various factors into account..

1 INTRODUCTION

Adolescents are certainly vulnerable to nutritional problems because they are undergoing the transition from childhood to adulthood, marked by physical, physiological, and psychosocial changes. They begin to become aware of their own thought processes, are brave in trying new things, despite sometimes being impulsive, have problem-solving skills, and develop morals and values. Furthermore, this group is in a phase of rapid growth, requiring relatively greater amounts of nutrients than before, significantly impacting their nutritional status. The growth phenomenon during adolescence demands high nutritional needs to achieve maximum growth and development potential, as nutrition and growth

are integrally linked, closely interrelated and inseparable. If nutritional needs during adolescence are not met, it can result in delayed sexual maturation and stunted linear growth (the rapid and significant increase in height that occurs during puberty). Nutrition during adolescence also plays a crucial role in preventing chronic, nutrition-related diseases in adulthood, such as cardiovascular disease, diabetes, cancer, and osteoporosis (IDAI Youth Task Force, 2019).

Nutritional status is a measuring tool to determine success in meeting adolescent nutritional needs and the use of nutrients indicated by body weight and height of teenagers. Adolescents require energy/calories, protein, calcium, iron, zinc, and vitamins to meet the various physical activities required at school and in their daily lives. Every adolescent naturally desires a healthy and well-proportioned body to meet the demands of physical activity. This energy consumption naturally comes from food, and the energy obtained will offset the energy intake and expenditure (Winarsi, 2018).

However, the prevalence of overweight adolescents remains quite high, with 14.6% being overweight and 4.8% being obese. Combined, the total number of overweight adolescents reaches 19.4%. During adolescence, nutritional fulfillment depends on good and healthy eating habits, as adolescents are required to consume three main meals a day. Furthermore, undernutrition is often caused by other factors, including a lack of knowledge and a lack of physical activity.

Nutritional knowledge is a key factor in choosing healthy foods. A person's nutritional knowledge will influence their food choices and consumption of appropriate, varied, balanced foods that will not cause certain diseases. Those lacking nutritional knowledge will typically choose foods that appeal most to their five senses and not choose foods based on their nutritional value. (Hadi, S. D. P., Soeyono, R. D., & Sutiadiningsih, A. 2025). Conversely, those with greater nutritional knowledge will naturally use their knowledge and rational judgment more effectively.

This lack of knowledge among adolescents may be a contributing factor to the high consumption of fast food, large portions, and simply to feel full without considering their individual nutritional needs and balance. Furthermore, adolescents often spend more time outside the home and tend to skip meals, ultimately consuming more readily available snacks that are high in calories and fat. Physical activity also affects the nutritional status of adolescents. Lack of physical activity results in a large amount of stored energy that eventually becomes fat, and can trigger obesity. This suggests that physical activity levels influence or contribute to excess weight, especially if someone has a sedentary lifestyle, rarely exercises lightly daily, watches television, and uses computers, cell phones, or other technological devices for hours on end.

Currently, many adolescents fail to consider the balance between energy intake and energy expenditure. This can lead to nutritional problems such as weight gain, or conversely, excessive energy expenditure can lead to malnutrition (Mardalena, 2017).

Based on this background, the researchers were interested in conducting a study on the relationship between nutritional knowledge and physical activity with the nutritional status of adolescents at SMP Negeri 2 Jogorogo, Ngawi

Regency. This is because during adolescence, nutritional status is crucial, as adolescents sometimes neglect to adapt to changing lifestyles to achieve healthy and optimal nutritional status. The population of this study were subjects who met the established criteria, namely all ninth grade students at SMP Negeri 2 Jogorogo, Ngawi Regency, totaling 30 students.

2 METHOD

This study is a quantitative study with a correlational analytical approach using a cross-sectional design. This design was chosen because the study was conducted at a specific point in time. The aim was to determine the relationship between knowledge of balanced nutrition and physical activity and the nutritional status of adolescents at SMP Negeri 2 Jogorogo, Ngawi Regency. The independent variables in this study were nutritional knowledge and physical activity, while the dependent variable was adolescent nutritional status, as measured by Body Mass Index for Age (BMI/Age).

The subjects of this study were all 30 ninth-grade students at SMP Negeri 2 Jogorogo, Ngawi Regency. The sampling technique used was total sampling, thus the entire population was included in the study. This method is expected to provide a comprehensive picture of the nutritional status, frequency of physical activity, and level of nutritional knowledge among this group of students. This study was conducted on Tuesday, July 15, 2025, from 9:00 to 11:00 a.m. Western Indonesian Time (WIB) in the auditorium of SMP Negeri 2 Jogorogo, Ngawi Regency. Data collection was conducted through two methods. namely primary data obtained using pre-test and post-test to measure the level of knowledge of balanced nutrition and frequency of physical activity in adolescents, as well as through anthropometric measurements in the form of weight, height, mid-upper arm circumference (MUAC), and abdominal circumference to determine nutritional status in students. Calculation of nutritional status was carried out using the Body Mass Index for Age (BMI/U) according to WHO standards in 2007 with categories of malnutrition (<-3 SD), undernutrition (-3 SD to <-2 SD), good nutrition (-2 SD to +1 SD), overnutrition (+1 SD to +2 SD) and obesity (> +2 SD). In addition, secondary data was also collected from relevant school documents, such as student lists and administrative data.

The operational definition in this study is knowledge of balanced nutrition, defined as the level of adolescents' understanding of balanced nutrition, including the components of a healthy lifestyle, food selection, the importance of physical activity and healthy living, and the benefits of regularly monitoring body weight. This knowledge was measured using pre- and post-test sheets designed based on balanced nutrition indicators, with assessments categorized as good, adequate, and inadequate, with a score of 60-100%. <60% is considered inadequate, 60-80% is considered adequate, and >80% is considered good. Meanwhile, physical activity is assessed by the frequency of physical activity, both at school and outside of school, categorized as light, moderate, and heavy. The adolescents' nutritional status is defined as their nutritional condition, determined through anthropometric measurements using the BMI/U indicator. Nutritional status is then categorized as

underweight, normal, and overweight, according to the 2007 WHO growth standards.

The collected research data was then processed using SPSS (Statistical Package for the Social Sciences). Data analysis was carried out in stages. First, univariate analysis was used to describe each research variable in the form of frequency distributions and percentages, including nutritional knowledge (categories: insufficient, sufficient, good), physical activity (categories: light, moderate, heavy), and nutritional status (categories: underweight, normal, overweight). This analysis aimed to provide a general overview of the respondents' characteristics based on the variables studied.

Next, bivariate analysis was conducted to determine the relationship between the independent variables (nutrition knowledge and physical activity) and the dependent variable (nutritional status). The statistical test used was the chi-square (χ^2 test of independence) because all study variables were categorical. The significance level was set at 0.05, so a p-value <0.05 indicates a significant relationship. To further deepen the analysis, a multivariate test using multinomial logistic regression was also conducted. This analysis aimed to identify the variables most influential on adolescent nutritional status, with the final results presented as an odds ratio (OR) along with a 95% confidence interval.

3 RESULT

The results of this study on the relationship between nutritional knowledge and physical activity with nutritional status in adolescents at SMP Negeri 2 Jogorogo, Ngawi Regency are that the results of the study were compiled based on primary data obtained through questionnaires and anthropometric measurements including height, weight, upper arm circumference, and waist circumference of 30 respondents, grade IX students. The presentation of the results of this study begins with a general description of the respondents, including distribution by gender and age. Next, the distribution of respondents based on the main research variables, namely the level of nutritional knowledge, level of physical activity, and nutritional status, is shown. After that, the results of bivariate and multivariate analyses are presented to determine the relationship between nutritional knowledge and physical activity with the nutritional status of adolescents.

Table 1: Distribution of Respondents by Gender

No.	Gender	Frequency (f)	Pecentage (%)
1.	Boy	20	66,6%
2.	Girl	10	33,3%
	Total	30	100%

Source : prmary data

Based on the distribution in Table 1, it can be seen that of the 30 respondents, the majority were male (20, representing 66.6%), while 10 were female (33.3%). This indicates that the proportion of male students was higher than that of female students in this study. This difference in numbers provides an initial indication that the majority of the data obtained predominantly represents male adolescents.

Theoretically, gender can generally influence physical activity patterns and nutritional status. Male adolescents generally have higher levels of physical activity than female adolescents because they tend to engage in more physical activities such as sports or outdoor activities. Conversely, female adolescents

tend to engage in lighter physical activity, potentially affecting their energy needs and nutritional status. Therefore, the difference in the proportion of male and female respondents in this study is important to consider in the analysis, particularly in examining the relationship between nutrition knowledge, physical activity, and nutritional status in adolescents. (WHO 2022).

Table 2: Distribution of Respondents by Age

No.	Age	Frequency (f)	Percentage (%)
1.	13-16	30	100%
	Total	30	100%

Source : primary data

Based on the distribution in Table 2, it can be seen that the majority of respondents were 14 years old, namely 23 people (76.6%). Respondents aged 15 years numbered 5 people (16.6%), while respondents aged 13 years and 16 years each only had 1 person (3.3%). This indicates that this study predominantly represents adolescents aged 14 years, who are included in the early adolescent category. Developmentally, the age of 13–15 years is a transition period from early adolescence to middle adolescence. During this period, there is an acceleration in height growth (growth spurt), hormonal changes, and a significant increase in nutritional needs. This age is also a crucial phase in the formation of eating habits and physical activity patterns that can affect nutritional status. With the predominance of respondents aged 14 years, the results of this study tend to better describe the nutritional status and physical activity of early adolescence, so it is important to consider this in data interpretation, especially when comparing with other age groups.

Table 3: Distribution of Respondents Based on Nutritional Knowledge

No.	Knowledge	Frequency (f)	Percentage (%)
1.	Less	1	3,3%
2.	Enough	5	16,6%
3.	Good	24	80%
	Total	30	100%

Source : primary data

Based on the distribution in Table 3, it can be seen that the majority of respondents had a good level of nutritional knowledge, namely 24 respondents (80%). Five respondents (16.6%) had sufficient nutritional knowledge, and only one respondent (3.3%) fell into the poor category. This category was determined based on the nutritional knowledge questionnaire score, with a score below 60 categorized as poor, 60-80 categorized as sufficient, and >80 categorized as good.

These results indicate that the majority of ninth-grade adolescents at SMP Negeri 2 Jogorogo have good nutritional knowledge. This high level of nutritional knowledge is likely influenced by their extensive access to information through school, the media, and their family and surrounding environment. However, there were still respondents with sufficient and poor nutritional knowledge, indicating that not all adolescents have received nutritional information equally. This could be due to limited access to knowledge, given that SMP Negeri 2 Jogorogo is located in a rural area that tends to have limited information sources compared to urban areas. This condition indicates the need for more intensive and comprehensive nutritional education efforts so that all adolescents have a good understanding of balanced nutrition and health.

Table 4: Distribution of Respondents Based on Physical Activity

No.	Physical Activity	Frequency (f)	Percentage (%)
1.	Light	10	33,3%
2.	Medium	4	13,3%
3.	Heavy	16	53,3%
	Total	30	100%

Source :primary data

Based on the distribution of Table 4, it can be seen that most respondents have heavy physical activity, namely 16 people with a percentage (53.3%). A total of 10 respondents with a percentage (33.3%) are included in the light physical activity category, while the remaining 4 people with a percentage (13.3%) are in the moderate physical activity category. These data show that the majority of adolescents, especially boys, tend to have high physical activity. Respondents with light physical activity are mostly female adolescents who do sports. Based on Table 4, it can be seen that most respondents have heavy physical activity, namely 16 people (53.3%). A total of 10 respondents (33.3%) are included in the light physical activity category, while the remaining 4 people (13.3%) are in the moderate physical activity category. These data show that the majority of adolescents, especially boys, tend to have high physical activity.

Table 5: Distribution of Respondents Based on Nutritional Status

No	Nutritional Status	Frequency (f)	Percentage (%)
1	Underweight	1	3,3%
2	Normal	23	76,6%
3	Overweig ht	6	20%
Total	30	30	100%

Source : primary data

Based on the distribution in Table 4, it can be seen that the majority of respondents have normal nutritional status, namely 23 people with a percentage of (76.6%). Then, 6 respondents with a percentage (20%) are included in the overweight category, while there is only 1 respondent with a percentage (3.3%) who is classified as underweight. These results indicate that the majority of ninth-grade adolescents at SMP Negeri 2 Jogorogo are in a normal nutritional condition or have met the standards, although there are still a small number who experience nutritional problems, both deficient and excess.

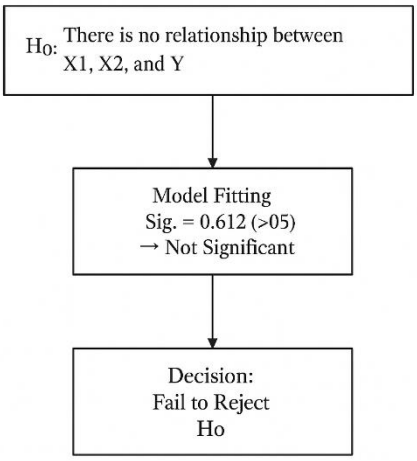

Figure 1. Ordinal Regression Hypothesis Test Results Diagram

Based on the results of the ordinal regression test that has been carried out with the dependent variable Nutritional Status (Y) and the independent variables Nutrition Knowledge (X1) and Physical Activity (X2), the Model Fitting Information value obtained with the Chi-Square test is 0.983 and Significance (Sig.) = 0.612. This value is greater than 0.05, so it can be concluded that the model with nutritional knowledge and physical activity is not significantly better than a model without predictor

variables. This statistically indicates that the two independent variables do not significantly influence nutritional status. Furthermore, the Goodness-of-Fit test results showed a Pearson Sig. of 0.804 and a Deviance of 0.707, both of which were greater than 0.05. Thus, the model used was found to be a good fit for the research data. However, the Pseudo R-Square (McFadden) value of 0.026 indicated that nutritional knowledge and physical activity only explained 2.6% of the variation in students' nutritional status. The remainder was influenced by other factors not included in the research model.

When examined individually, nutritional knowledge (X1), the majority of which was in the good category (80%), did not significantly influence nutritional status (Sig. > 0.05). This can be seen through the majority of respondents who are in the normal nutritional status category with a percentage reaching (76.6%), which of course is independent of the level of nutritional knowledge possessed by students. This also applies to the second variable, namely physical activity (X2) which is mostly in the heavy category with a percentage reaching (53.3%), but also does not have a significant effect on student nutritional status (Sig. > 0.05). Respondents with the category of doing heavy physical activity are still dominated by their normal nutritional status, but there are still respondents with overweight nutritional status, this shows that physical activity alone is not enough to explain variations in nutritional status in adolescent students of grade IX of SMP Negeri 2 Jogorogo.

4 DISCUSSION

In this study, nutritional knowledge was categorized into three categories: good, adequate, and inadequate. Univariate results showed that almost all respondents (24 respondents, 80%) had good nutritional knowledge. Furthermore, 5 respondents (16.6%) had adequate nutritional knowledge, and only 1 respondent (3.3%) had inadequate nutritional knowledge. Good nutritional knowledge does not always coincide with healthy eating practices in daily life. For example, research by Hadi et al. (2025) found that nutritional knowledge did not significantly influence adolescents' eating behavior. This may be because individual food choices are largely influenced by attitudes and environmental factors. This may explain why respondents with good nutritional knowledge can still be overweight if their eating behaviors are still inappropriate. For example, they still enjoy consuming fast food, consume sweet foods and drinks too frequently, and have irregular eating patterns.

Meanwhile, in this study, physical activity was also categorized into three categories: light, moderate, and heavy. Univariate results showed that respondents with heavy physical activity reached half of the total respondents, namely 16 people, with a percentage of 53.3%. Then, respondents with moderate physical activity were only 4 respondents, with a percentage of 13.3%. And respondents with light physical activity were dominated by female students, with 10 respondents, with a percentage of 33.3%.

The results of the ordinal regression analysis indicate that the nutritional knowledge variable (X1) does not significantly influence the nutritional status (Y) of ninth-grade adolescents at SMP Negeri 2 Jogorogo. This is indicated by a significance value greater than 0.05 and a low Pseudo R^2 value of 0.026, indicating that the contribution of nutritional

knowledge to variations in nutritional status is very small. These results indicate that although a large or majority of respondents have good nutritional knowledge, reaching a percentage of up to 80%, this does not necessarily impact their nutritional status. This aligns with findings by Kretschmer (2023), which showed that there are differences between the physical activity levels of male and female adolescents. However, nutritional status is still determined primarily by total energy balance, namely the interaction between calorie intake and energy expenditure. In other words, even though most respondents engage in vigorous physical activity, while consuming excess energy, they can still become overweight.

The results of the bivariate analysis between physical activity (X2) and nutritional status (Y) also showed no significant effect. Although more than half of the respondents engaged in vigorous physical activity (up to 53.3%), this was not directly related to their nutritional status. These results indicate that physical activity alone is insufficient to influence nutritional status without being balanced with nutritional intake appropriate to each individual's needs. Furthermore, some adolescents with vigorous physical activity may have high-calorie and high-sugar consumption patterns, resulting in energy intake equaling or even exceeding energy expenditure. Therefore, high levels of physical activity do not necessarily guarantee a person has normal nutritional status.

Nutritional knowledge is one factor that may influence a person's nutritional status, but it doesn't have a direct impact and is merely a supporting factor. According to the UNICEF framework, factors that directly influence nutritional status are daily food intake and infectious diseases. If food intake is sufficient and meets nutritional needs, an individual's nutritional status will be optimal or good. The amount of energy required by each person depends on their age, gender, weight, height, and specific conditions. Conversely, if food intake is insufficient or excessive (not meeting nutritional needs), the individual will be undernourished or overnourished.

According to Festi P (2018), several factors influence adolescent attitudes and behavior, one of which is knowledge. For example, if an adolescent has good knowledge about balanced nutrition, they will naturally behave well, especially by implementing a healthy diet in their daily life to achieve normal nutritional status, allowing the body to function optimally and be less susceptible to disease. Furthermore, growth spurts also influence adolescents' nutritional status, due to the increasing size of their bodies and organs, which dictates nutritional needs for each individual. Furthermore, age also impacts nutritional status, as young people, especially those under 20, require significant nutritional intake during their growth period. Other factors include the type of activity and physical activity, which are essential for daily activities. In this study, all respondents under 20 years of age, who require significant nutritional intake, had greater knowledge about nutrition, and a pattern of physical activity, mostly performed at school, with varying levels and types, ranging from light to vigorous physical activity.

According to (Widiastuti & Widiyaningsih, 2022), factors influencing nutrition in adolescents can be caused by eating habits and physical activity. Physical activity in adolescents generally begins to increase, requiring sufficient

energy intake to support physical activity. Adequate activity and balanced food intake can also affect nutritional status in adolescents. If the nutritional intake exceeds the daily needs but is still balanced with physical activity, it will not pose a risk of excessive weight change in adolescents. Researchers assume that physical activity can affect nutritional status because the benefits of physical activity are to maintain ideal body weight and can help increase the body's metabolism, causing energy reserves stored in the body in the form of fat that can be burned as calories. However, unfortunately, today's adolescents on average only engage in light physical activity due to laziness after school, so they no longer want to do other physical activities.

A Based on the results of the distribution calculation, the majority of respondents were male (66.6%) and the majority were 14 years old (76.6%). This proportion indicates that the study predominantly represented male adolescents in the early adolescent phase. Theoretically, male adolescents tend to have higher levels of physical activity compared to female adolescents, who generally have higher levels. This difference can affect daily energy needs and nutritional status. Meanwhile, adolescents aged 13–15 years are in a period of growth spurt or accelerated growth characterized by increased needs for energy, protein, and micronutrients. Therefore, although nutritional knowledge and physical activity did not significantly influence nutritional status in this study, the distribution of respondents dominated by male adolescents and 14 years old may also provide an illustration that normal nutritional status is more common in groups with relatively high energy needs and physical activity that tends to be heavy or active.

5 CONCLUSIONS

This study shows that the majority of ninth-grade adolescents at SMP Negeri 2 Jogorogo have good nutritional knowledge (80%), moderate physical activity (53.3%), and normal nutritional status (76.6%). However, the ordinal analysis showed no significant correlation between nutritional knowledge and physical activity with nutritional status ($p = 0.612$; Pseudo $R2 = 0.026$). This indicates that nutritional knowledge and physical activity contribute little to explaining variations in nutritional status, while nutritional status is largely influenced by factors outside the research model, namely daily consumption patterns, socioeconomic factors, biological factors, and family environment. Therefore, it can be concluded that adolescent nutritional status is the result of a multifactorial interaction that cannot be explained solely by nutritional knowledge and physical activity.

Based on the study results, adolescents are advised to pay more attention to the balance between daily food intake and physical activity. Good nutritional knowledge also needs to be applied in daily life, for example by getting into the habit of consuming healthy snacks like fruit, increasing vegetable consumption, and choosing side dishes that contain high protein such as fish, meat, or eggs. Teenagers must also be able to regulate their diet to avoid excessive consumption of fast food and high-sugar drinks, because even though teenagers have high physical activity, excessive energy intake can still increase the risk of being overweight. Furthermore, maintaining the habit of drinking enough water according to daily needs is very important to support the body's metabolism and

overall health. By implementing a balanced diet and a consistently active lifestyle, adolescents are expected to maintain normal nutritional status and prevent nutritional problems in the future.

6 REFERENCES

Alfiyatur Rahmah, Ony Linda, & Dian Kholika Hamal. (2024). Faktor-Faktor yang Berhubungan dengan Status Gizi pada Remaja di SMP Negeri 262 Jakarta Timur Tahun 2024. *SEHATMAS: Jurnal Ilmiah Kesehatan Masyarakat*, *3*(3), 549–563. https://doi.org/10.55123/sehatmas.v3i3.3974

Ariaini, S., Nisa, A., Yulianti, Y., & Solechah, S. A. (2022). Hubungan Pengetahuan Gizi dan Aktivitas Fisik dengan Status Gizi Remaja Perempuan di SMP Negeri 1 Banjarbaru. *Jurnal Kesehatan Indonesia*, *13*(1), 1. https://doi.org/10.33657/jurkessia.v13i1.769

Aulia, N. R. (2021). Peran Pengetahuan Gizi Terhadap Asupan Energi, Status Gizi Dan Sikap Tentang Gizi Remaja. *Jurnal Ilmiah Gizi dan Kesehatan (JIGK)*, *2*(02), 31–35. https://doi.org/10.46772/jigk.v2i02.454

Faridi, A., Vidyarini, A., & Prasetya, A. Y. (2023). Hubungan Pengetahuan, Kebiasaan Sarapan Dan Asupan Zat Gizi Makro Sarapan Dengan Status Gizi Pada Remaja. *JURNAL RISET GIZI*, *11*(2), 106–113. https://doi.org/10.31983/jrg.v11i2.10615

Ganis, H. Y., Nur, M. L., & Riwu, R. R. (2023). HUBUNGAN ANTARA DURASI PENGGUNAAN GAWAI, AKTIVITAS FISIK DAN POLA MAKAN DENGAN STATUS GIZI REMAJA DI SMPK ST. IGNATIUS LOYOLA. *Jurnal Pangan Gizi dan Kesehatan*, *12*(1), 24–35. https://doi.org/10.51556/ejpazih.v12i1.188

Halawa, D. A. P. T., Sudargo, T., & Siswati, T. (2022). MAKAN PAGI, AKTIVITAS FISIK, DAN MAKAN MALAM BERHUBUNGAN DENGAN STATUS GIZI REMAJA DI KOTA YOGYAKARTA. *Journal of Nutrition College*, *11*(2), 135–142. https://doi.org/10.14710/jnc.v11i2.33184

Herawati, V., Rizqi, E. R., & Afrinis, N. (2023). *HUBUNGAN ASUPAN ENERGI PROTEIN DAN PENGETAHUAN TENTANG GIZI SEIMBANG DENGAN STATUS GIZI REMAJA DI POSYANDU REMAJA DESA PANGKALAN JAMBI KECAMATAN BUKIT BATU*. *4*.

Iva Sulistya, Anindya Hapsari, & Hartati Eko Wardani. (2023). Hubungan Status Gizi, Aktivitas Fisik Dan Konsumsi Junk Food Dengan Keteraturan Siklus Menstruasi Pada Remaja Putri Di SMP Negeri 2 Kota Malang. *Jurnal Medika Nusantara*, *1*(4), 436–447. https://doi.org/10.59680/medika.v1i4.644

Lestari, P. Y., Tambunan, L. N., & Lestari, R. M. (2022). Hubungan Pengetahuan tentang Gizi terhadap Status Gizi Remaja. *Jurnal Surya Medika*, *8*(1), 65–69. https://doi.org/10.33084/jsm.v8i1.3439

Listianasari, Y., & Putra, A. F. E. (2023). *Asupan Lemak dan Aktifitas Fisik pada Siswa Sekolah Menengah Pertama dengan Status Gizi Gemuk*. *04*(02).

Mokoagow, A., & Munthe, D. P. (n.d.). *HUBUNGAN AKTIVITAS FISIK DENGAN STATUS GIZI DI SMP NASIONAL MOGOYUNGGUNG*.

Noviyanti, R. D., & Marfuah, D. (2017). Hubungan Pengetahuan Gizi, Aktivitas Fisik, dan Pola Makan Terhadap Status Gizi Remaja Di Kelurahan Purwosari Laweyan Surakarta.

Rani Riwu, Utma Aspatria, & Rut Rosina Riwu. (2024). Hubungan Kebiasaan Sarapan dan Aktivitas Fisik dengan Status Gizi Remaja di SMP Negeri 6 Kupang. *SEHATMAS: Jurnal Ilmiah Kesehatan Masyarakat*, *3*(1), 40–48. https://doi.org/10.55123/sehatmas.v3i1.2626

Roring, N. M., Posangi, J., & Manampiring, A. E. (2020). Hubungan antara pengetahuan gizi, aktivitas fisik, dan intensitas olahraga dengan status gizi. *Jurnal Biomedik:JBM*, *12*(2), 110. https://doi.org/10.35790/jbm.12.2.2020.29442

Suryawati, A., Kisnawaty, S. W., & Setiyaningrum, Z. (2024). Hubungan Pengetahuan Pedoman Gizi Seimbang terhadap Status Gizi Remaja di SMP Muhammadiyah 1 Gatak. *Ranah Research : Journal of Multidisciplinary Research and Development*, *7*(1), 1–6. https://doi.org/10.38035/rrj.v7i1.1164

Toaha, A. (2025). Hubungan Status Gizi Terhadap Pola Makan Dan Aktivitas Fisik Pada Siswa SMP Negeri 3 Samarinda Tahun 2025.

Wahyuni Septica, Q. (2023). Hubungan Aktivitas Fisik Dan Body Image Dengan Status Gizi Pada Remaja Putri Di MTS Persis Kota Sukabumi. *Jurnal Health Society*, *12*(2). https://doi.org/10.62094/jhs.v12i2.112

Waluyani, I., Siregar, F. N., Anggreini, D., Aminuddin, A., & Yusuf, M. U. (2022). Pengaruh Pengetahuan, Pola Makan, dan Aktivitas Fisik Remaja Terhadap Status Gizi di SMPN 31 Medan, Kecamatan Medan Tuntungan. *PubHealth Jurnal Kesehatan Masyarakat*, *1*(1), 28–35. https://doi.org/10.56211/pubhealth.v1i1.31

Wa Ode Siti Nur Asnia, Devi Savitri Effendy, & Ruwiah Ruwiah. (2025). Hubungan Pengetahuan Gizi dengan Status Gizi pada Remaja Putri di SMP Negeri 5 Kendari Tahun 2024. *Jurnal Medika Nusantara*, *3*(1), 86–93. https://doi.org/10.59680/medika.v3i1.1657

Wulandari, R. F., Rizqi, A., & Negara, M. I. P. (2025). *Hubungan Pengetahuan Gizi Seimbang dengan Status Gizi sebagai Indikator Keberhasilan Program Makan Bergizi Gratis Pada Siswa*. *8*(2).