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The Relationship Between Physical Activity and Fruit and Vegetable Consumption Habits and Obesity in College Students in Papua Province

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ABSTRACT

***Background**: Obesity is a growing health problem, including among university students. The Indonesian government, through the Healthy Living Community Movement (GERMAS), promotes healthy lifestyles as a preventative measure against non-communicable diseases, including obesity. This study aims to determine the relationship between physical activity, fruit and vegetable consumption, and the incidence of obesity among university students in Papua Province. **Methods**: This study used a quantitative approach with a cross-sectional design. The respondents were 127 university students studying in Jayapura City, selected using proportionate stratified random sampling. Data were collected using questionnaires and Body Mass Index (BMI) measurements, and analyzed using the Chi-Square test. **Results**: The results of the study showed a significant relationship between physical activity (p = 0.028, < 0.05) with a relative risk (RP) value of 3.119, and fruit and vegetable consumption (p = 0.005, < 0.05) with an RP value of 3.160, in relation to obesity. Activities within the Healthy Living Community Movement are mandatory for students as a form of prevention against non-communicable diseases. The movement, which encourages physical activity and the consumption of fruits and vegetables, should be implemented as a regular program at both public and private universities in Papua Province. University leaders in charge of student affairs are required to allocate regular funds to support this initiative.*

***Keywords**: Physical Activity, Fruit and Vegetable Consumption, Obesity*

INTRODUCTION

The Indonesian government, through Presidential Instruction No. 1 of 2017, introduced the Healthy Living Community Movement (GERMAS) as a preventive and promotional strategy to combat and manage non-communicable diseases, including obesity. GERMAS focuses on three primary actions: (1) engaging in at least 30 minutes of physical activity each day, (2) consuming fruits and vegetables daily, and (3) participating in regular health check-ups (Ministry of Health of the Republic of Indonesia, 2017). More than just a campaign, GERMAS calls for behavioral changes to ensure the consistent practice of a healthy lifestyle (Inpres, 2017).

Several non-communicable diseases linked to poor healthy lifestyle practices include type 2 diabetes mellitus, coronary heart disease, hypertension, stroke, osteoarthritis, and certain types of cancer, such as breast and colorectal cancer (Sari, 2024). Obesity has become a major global public health concern (Nugroho, 2020), with its prevalence rising sharply over recent decades. According to the World Health Organization (WHO), global obesity rates have nearly tripled (Burhan, Susetyowati and Julia, 2023), with more than 650 million adults classified as obese in 2016—a figure that continues to climb annually. This surge is seen not only in developed nations but also in developing countries like Indonesia. Beyond affecting physical appearance (Kusumaningtyas, 2019), obesity significantly heightens the risk of numerous non-communicable diseases (NCDs) (Sari, 2024).

Obesity is a global public health problem whose prevalence has increased; Indonesia has seen a notable rise in obesity

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prevalence. Data from the 2023 Indonesian Health Survey show that 23.1% of individuals aged 18 and over were obese, an increase from 21.8% in 2018 (Kemenkes, 2024). This upward trend is alarming, as obesity is a key risk factor for early mortality and disability caused by non-communicable diseases (Nugroho, 2020). The issue affects not only individual health but also imposes considerable economic and social burdens on the country's healthcare system (Indonesia, 2019).

Papua Province, including its capital Jayapura City, is also grappling with similar issues. According to data from the Papua Central Statistics Agency (2024), the prevalence of obesity among adults in Jayapura City has reached 22.5%, making it one of the regions with a relatively high obesity rate in eastern Indonesia (Kemenkes, 2024). Students, as part of the young adult demographic, are in a transitional stage that is particularly susceptible to shifts in health-related behaviors (Karpika and Segel, 2021). University life often brings lifestyle changes, such as irregular eating patterns (Resky, Haniarti and Usman, 2019), greater reliance on fast food due to time limitations, academic stress, and reduced physical activity stemming from heavy academic demands (Ayomi, 2024). Various studies indicate that students represent a group with a notable tendency toward weight gain, including an increased risk of obesity (Moeins, Alhempi and Lukas, 2024).

Research conducted by (Dewantari and Sukraniti, 2020) revealed that individuals who consistently practiced the Healthy Living Community Movement experienced weight reduction, lower blood pressure, and enhanced physical fitness within six months. However, obesity rates continue to climb. Among those aged 18 and older, the prevalence of obesity rose steadily—from 10.5% in the 2007 Basic Health Research to 14.8% in 2013, and 21.8% in 2018. Similarly, central obesity among individuals aged 15 and older increased from 18.8% in 2007 to 26.6% in 2013, and 31.0% in 2018 (Ministry of Health, 2007, 2013, 2018; (Siswanto *et al.*, 2020).

The current stage of adolescence transitioning into adulthood requires close attention and guidance regarding healthy eating habits (Rahmawati *et al.*, 2020). The growing popularity of fast food, coupled with limited knowledge about nutritious dietary choices, contributes to obesity among adolescents approaching adulthood in Indonesia (Adriani *et al.*, 2024). This study aims to examine the relationship between the Healthy Living Movement—specifically physical activity and fruit and vegetable consumption—and obesity in university students in Papua. SKI data in Papua Province in 2023 showed that 50.4% of the 15–19 age group still lacked physical activity, while 40.0% of the 20–24 age group did. In this age group, 87% disliked consuming fruits and vegetables, and 21% disliked fruit. Based on this data, a healthy lifestyle movement among university students in Papua is essential to collectively combat non-communicable diseases. This study measures BMI to identify symptoms of obesity, as well as physical activity and fruit and vegetable consumption habits among students. This is the first time this research has been conducted involving university student leaders.

METHODS

This study employed an analytical observational design with a quantitative cross-sectional approach. A cross-sectional study examines the relationship between risk factors and outcomes at a single point in time through observation or data collection (Ardiawan *et al.*, 2022). The research explored the relationship between the Healthy Living Community Movement and obesity among students in Papua. Conducted from April to June 2025, the study targeted students from various regencies and cities within Papua Province. The research population consisted of 1,151 students, from which a random sampling technique was used to select 127 participants. Data collection utilized a physical activity questionnaire and a fruit and vegetable consumption questionnaire, both of which had been validated (Buku Panduan Germas, 2017). Using the WHO standard, the minimum daily fruit and vegetable consumption is 400 grams, equivalent to five servings. The breakdown is 250 grams of vegetables and 150 grams of fruit. The importance of consuming a variety of fruits and vegetables daily is also highlighted by the criteria of consumption if it meets WHO standards and if it does not meet WHO standards (Devirgiliis *et al.*, 2024).

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The WHO standards for physical activity are to engage in at least 150–300 minutes of moderate-intensity aerobic activity per week or 75–150 minutes of vigorous-intensity aerobic activity per week. If this is achieved, it is categorized as "doing"; if not, it is categorized as "not doing." The instrument used for physical activity assessment achieved a validity score of r = 0.895 with Sig. = 0.000, indicating validity, while the fruit and vegetable consumption instrument showed r values ranging from 0.642 to 1.000 with Sig. = 0.000–0.001, confirming its validity.

The process of collecting Body Mass Index (BMI) data involved the following steps:

Preparation of Tools and Materials:

A digital scale (GEA brand, model BR 9015B) with a maximum capacity of 150 kg was prepared for weight measurement, along with a microtoise for height measurement mounted perpendicular to a flat wall. Before weighing, the scale was calibrated using two 2.5-liter bottles of mineral water. A recording sheet was prepared to note measurement results, along with a calculator or software for BMI calculation.

Body Weight Measurement:

Participants stood upright on the digital scale, facing forward, with weight evenly distributed on both feet. The weight reading was taken in kilograms (kg) and recorded.

Body Height Measurement:

Participants stood straight with heels, buttocks, back, and head touching the wall. The head was aligned in the Frankfort plane, facing forward.

BMI Formula:

$$BMI = \frac{Height}{Body\ Weight}$$

Table 1. Body Mass Index (BMI)

BMI Category	BMI Value (kg/m^2)
Underweight	<18,5
Normal	18,5 – 22, 9
At Risk	23 – 24, 9
Class 1 Obesity	25-29,9
Class 2 Obesity	≥30

Sumber: Ministry of Public Health, 2023

Data processing involved univariate analysis and bivariate analysis. The bivariate analysis used the chi-square statistical test with a 95% confidence level (p = 0.05) to examine the relationship between the seven GERMAS indicators and obesity. This analysis was conducted using a computer program such as SPSS. This study received research approval from the Research Ethics Committee of Cenderawasih University, with approval number 169 / KEPK-FKM UC / 2025.

RESULTS AND DISCUSSION

Result

Table 2. Characteristics of Respondents who do physical activity and consume fruit and vegetables with Obesity in Students in Papua

Characteristics	Frekuensi (n)	Presentase (%)
Ages :		
18-22 year	94	74
23-25 year	28	22
> 25 year	5	4
Gender:		
Men	50	39,4
Woman	77	60,6
Ethnic group		
Papua	89	70
Non Papua	38	30
Residence status		
boarding house	54	43
Hostel	48	38
Parents	25	19
Atropometri		
Height :		
160-165 cm	99	78
170-176 cm	28	22
BMI		
Thin	3	2,4
Normal	40	31,5
Obesitas	60	47,2
Overweigth	24	18,9
Total	127	100

Healthy Living Community Movement Indicators

Table 3. Frequency Distribution of Healthy Living Community Movement Indicators and BMI Measurement Results among Students in Papua

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Healthy Living Community Movement Indicators and BMI Measurement	Frekuensi (n)	Presentase (%)
Physical Activity		
No	26	20,5
Yes	101	79,5
Consumption of Fruits	46	36,2
No	81	63,8
Yes		
Comsumption of Vegetables	51	40,2
No	76	50,8
Yes		
BMI Measurement Results	66	52,0
Obesity	61	48,0
Non-Obesity		
Total	**127**	**100**

Respondents who engage in physical activity regularly numbered 101 people (79.5%), while 26 people (20.5%) do not engage in physical activity. A total of 81 respondents (63.8%) consume fruit regularly, whereas 46 people (36.2%) do not. Regarding vegetable consumption, 76 respondents (59.8%) consume vegetables, while 51 people (40.2%) do not. Based on BMI measurements, 66 respondents (52.0%) fall into the obese category, while 61 people (48.0%) are not classified as obese.

Analysis of the correlation between physical activity levels and fruit and vegetable consumption habits with obesity among students in Papua.

Tabel 4. The Relationship Between Physical Activity and Consume Fruti and Vegetables and Obesity in Papuan Students

Variabels	Measurement results IMT							
	Obesity		Non Obesity		Total		*p-value*	RP 95% CI
	n	%	n	%	N	%		
Physical Activity								
No	19	73,1	7	12,5	26	100	0,028	3,119 (1, 205 – 8, 069)
Yes	47	46,5	54	53,5	101	100		
Consume fruit and vegetables								
No	32	69,6	14	30,4	46	100	0,005	3,160 (1,467 – 6, 808)
Yes	34	42,0	47	58,0	81	100		

Source: Primary Data

The analysis revealed a p-value of 0.028 (< α = 0.05), indicating a significant association between physical activity and obesity status. An RP (relative risk) value of 3.119 with a 95% CI of 1.205–8.069 suggests that individuals who are physically inactive have approximately three times higher risk of developing obesity compared to those who are physically active. Since the confidence interval does not include the value of 1, physical inactivity can be considered a significant risk factor for obesity in this population. These findings highlight the important role of regular physical activity in preventing obesity and maintaining a healthy body weight.

The findings also indicate a p-value of 0.005 (< α = 0.05), signifying a significant link between fruit and vegetable intake and obesity occurrence. An RP of 3.160 with a 95% CI of 1.467–6.808 shows that individuals who do not consume fruits and vegetables have roughly three times the risk of obesity compared to those who consume them regularly. Since the lower CI value is greater than 1, the result is statistically significant, confirming that inadequate fruit and vegetable

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consumption is a risk factor for obesity. This emphasizes the importance of balanced dietary patterns, particularly adequate fruit and vegetable intake, as part of obesity prevention strategies.

Discussion

Analysis of the Healthy Living Community Movement and Obesity Among University Students in Papua

The Healthy Living Community Movement aims to promote a healthier lifestyle, encouraging communities to incorporate its seven key indicators into daily activities. In line with Presidential Instruction No. 1 of 2017, proper implementation of these indicators can help reduce the prevalence of non-communicable diseases gradually over time (Inpres, 2017). Adolescents and young adults are considered at-risk groups that require serious attention.

The results of this study show that the largest age group was 18-24 years old, comprising 94 students. A psychology article states that increasing age correlates with an individual's improved ability to control emotions, based on past experiences (Pamungkas, Sumardiko and Makassar, 2024). As adolescents transition into early adulthood, they experience several physical and emotional changes, including shifts in health behaviors. The ability to choose a healthy lifestyle, engage in physical activity, and consume fruits and vegetables is crucial. These positive choices naturally develop from emotional growth and maturation. As individuals mature, the desire to adopt a healthy lifestyle becomes a conscious decision, and community-based healthy living movements are implemented to support this shift.

Biologically and psychologically, women and men differ in how they regulate and manage their emotions. Merrel and Wesley suggest that these differences stem from the distinct socio-emotional roles of men and women. Women generally tend to have better socio-emotional abilities than men, particularly in self-regulation and social skills (Pamungkas, Sumardiko and Makassar, 2024).

This study involved more women than men, as there were more female students than male students, increasing the likelihood of women participating as respondents. However, in terms of learning ability and academic achievement, (Munawarah, 2021) study on the influence of gender on psychological factors in student learning found that gender differences significantly affect psychological factors in student learning by approximately 70%. These psychological factors include learning motivation, interest, and emotional intelligence (Munawarah, 2021).

An emotionally intelligent person can engage in activities that impact themselves, their family, and their community. These activities influence health by promoting healthy living practices, such as physical activity and daily fruit and vegetable consumption. This study found that physical activity and fruit and vegetable intake are significantly correlated with obesity.

The majority of the ethnic groups in this study were indigenous Papuans, characterized by curly hair and brown skin. Papua Province, with its capital in Jayapura, still faces numerous challenges related to the uneven distribution of healthcare workers. This results in a significant workload for healthcare providers due to a shortage of personnel responsible for delivering healthcare services (Afrida & Wulandari, 2022). In this study, 61 students were classified as obese, 26 students did not engage in physical activity, 46 did not consume fruit, and 51 did not eat vegetables. Effective communication between health workers and at-risk groups should be an appropriate intervention and preventive measure. However, in Papua, the number of health workers remains very limited.

The environment contributes approximately 60% to behavioral change, compared to behavior, health services, and genetics. According to Bloom, the social environment refers to the area or place where a person lives, interacts, and socializes with people around them. It includes the family environment, school environment, and peer groups (Sapara, Lumintang and Paat, 2020). Many students live in boarding houses, meaning they are immersed in social environments that are easily influenced by those around them. During adolescence, individuals face numerous demands and pressures from their environment, which can pose challenges they must overcome. When these challenges are addressed positively,

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adolescents become stronger and more mature. However, adolescents in search of their identity may perceive problems as frightening and try to avoid them, which can lead to increased anxiety.

The World Health Organization (WHO) defines physical activity as any bodily movement produced by skeletal muscles that requires energy expenditure, including daily activities such as walking, running, or regular exercise (Suwandaru and Hidayat, 2021). This activity is essential for maintaining the body's energy balance and reducing excess fat accumulation (WHO, 2024). According to the Indonesian Ministry of Health (2023), engaging in at least 30 minutes of physical activity daily plays an important role in preventing obesity and other non-communicable diseases (Kemenkes, 2023).

Lack of movement or physical activity can lead to decreased fitness levels in children, with reduced motor skills across locomotor, non-locomotor, and manipulative areas (Baresi, Permadi and Hermawan, 2022). Obese children, in addition to motor skill impairments, tend to be stiff, less agile, and more susceptible to illness due to poor physical endurance. However, they often have relatively good balance. This condition can further hinder children's ability to participate in physical activity.

The results of this study reveal that 47 young people did not engage in physical activity, which contributed to their obesity. This fact supports the findings of (Erlena, Lilyanti and Sudiono, 2025), indicating that not all young people are able to perform adequate physical activity.

In a literature review of nine articles selected from PubMed, Google Scholar, and ScienceDirect databases, published between 2018 and 2023 across various countries, seven articles were carefully analyzed to explore the relationship between diet, physical activity, and obesity. The review highlights that dietary behavior and physical activity play crucial roles in the development and prevention of obesity. A balanced and healthy diet, combined with regular physical activity, is key to maintaining a healthy weight and overall well-being (Nabila *et al.*, 2024).

There were 19 individuals in this study who were inactive and obese. This finding may reinforce the common perception among young people that inactivity leads to obesity (Hafid and Hanafi, 2019). Therefore, preventative measures focused on promoting physical activity among university students are essential (Rahman *et al.*, 2023). The concept of physical activity should be widely shared among students to foster a shared understanding of what constitutes physical activity (Buku Panduan Germas, 2017).

The age range for college students is typically 17–23 years. At this age, students often lack the ability to fully determine what is right and beneficial for themselves and their environment, including engaging in physical activity (Fitria *et al.*, 2020). This aligns with previous studies (Nugroho, Kusumastuty and Cempaka, 2024), which state that regular aerobic exercise can significantly reduce body fat mass and help control weight. Furthermore, the Indonesian Ministry of Health (2022) emphasizes that at least 30 minutes of physical activity per day can reduce the risk of obesity and other non-communicable diseases such as diabetes, hypertension, and heart disease (Kemenkes, 2023).

Supporting facilities are present in various institutions, such as sports fields and the Car Free Day event every Saturday. However, the results of this study indicate that these opportunities have not been fully utilized by some students. According to L. Green's Theory, supporting facilities are a factor influencing SKI behavior (Healthy Lifestyle Behavior) in 2023. The theory states that in the age group over 10 years, 42.9% report a lack of time, and 33.3% feel too lazy to engage in physical activity (Ri, 2023).

Consuming fruits and vegetables is an important part of a healthy diet, playing a significant role in weight management and obesity prevention (Nay et al., 2020). Fruits and vegetables are high in dietary fiber, water content, and low in calories, which helps increase feelings of fullness and reduces excess energy intake (Zaki *et al.*, 2022). The World Health Organization (2020) recommends consuming at least 400 grams of fruits and vegetables daily to prevent non-communicable diseases, including obesity (Chandradewi, Linda and Hamal, 2025); (Qibtiyah, Rosidati and Siregar, 2021). Fruits also contain various micronutrients and antioxidants that support metabolism and overall health (Hardi, Indriasari and Hidayanti, 2019).

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The Risk Prevalence (RP) value of 3.160 indicates that students who do not consume fruits and vegetables have a threefold higher risk of obesity compared to those who regularly include these foods in their diet. The potential for fruit and vegetable consumption among the Papuan community is quite good, as fruits are easily accessible and affordable in Jayapura City, even outside of the seasonal harvest period (Woisiri, Mangalik and Nugroho, 2022). To maximize the impact on weight control, efforts should focus on increasing the frequency and diversity of fruit consumption among students (BPS, 2023).

However, another notable finding is that a significant portion of students aged 17–24 years dislike consuming fruits and vegetables. In this age group, 87% do not like to consume fruits and vegetables, and 21% dislike fruits specifically (Woisiri, Mangalik and Nugroho, 2022).

The results of the study showed that 32 students did not consume fruits and vegetables and were obese. This finding highlights the need to improve knowledge about fruit and vegetable consumption among all adolescents and students (Hadi, 2023). Increased knowledge can lead to behavior changes that align with health recommendations. Interestingly, students who eat fruits and vegetables still experience obesity, which suggests that simply consuming these foods does not automatically prevent obesity.

Research by Jauziyah indicates that nutritional knowledge serves as a reference for choosing healthy foods for the body (Jauziyah, 2021). A lifestyle characterized by physical activity and a healthy diet will determine a person's quality of life (Adik et al., 2022). Anthropometric data showed that 20 students were underweight, 41 had a normal weight, and 66 were obese. These anthropometric results can serve as baseline data for designing targeted interventions for at-risk groups.

Most students in the study have good physical activity levels, favorable anthropometric statuses, and adequate physical fitness. These findings support the importance of implementing structured fitness development programs to improve student health and academic performance. Obesity among students can be caused by lifestyle factors that are modifiable through health promotion interventions on campus, such as balanced nutrition counseling, increased access to sports facilities, stress management, and education about healthy sleep patterns. Promotive and preventive efforts initiated from a young age are expected to reduce the risk of obesity and chronic diseases in the future (Nurhidayat, 2025).

The limitations of this study include its focus solely on indicators of physical activity and fruit and vegetable consumption. There are also seven other indicators related to healthy community movement behaviors that could be studied in relation to the incidence of non-communicable diseases.

CONCLUSION

Physical activity is significantly associated with obesity. People who are physically active have approximately a threefold greater risk of obesity compared to those who are physically inactive (p = 0.028; RP = 3.119; 95% CI: 1.205–8.069). Similarly, fruit and vegetable consumption is significantly associated with a threefold increased risk of obesity (p = 0.005; RP = 3.160; 95% CI: 1.467–6.808). The Healthy Living Community Movement, which encourages physical activity and the consumption of fruits and vegetables, is essential for students as a preventative measure against non-communicable diseases. University leaders responsible for student affairs are required to allocate regular funds and establish the Healthy Living Community Movement as a routine program in both public and private universities.

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REFERENCES

Adriani, F. *et al.* (2024) 'Studi Pengetahuan Mahasiswa Tentang Dampak Makanan Cepat Saji di Universitas Almarisah Madani', *Jurnal Sains dan Kesehatan*, 8(2), pp. 83–90.

Ardiawan, K. N. *et al.* (2022) 'Penelitian kuantitatif', *Yayasan Penerbit Muhammad Zaini*.

Ayomi, M. B. (2024) 'Implementation of

Received: 31-07-2025, Accepted: 12-02-2026, Published Online: 05-03-2026

the Healthy Living Community Movement (GERMAS) for students in Jayapura City', in *1st Halu Oleo International Conference on Public Health (HOICPH 2023)*. Atlantis Press, pp. 42–50.
Baresi, M. R., Permadi, A. A. and Hermawan, I. (2022) 'Pengaruh aktivitas fisik terhadap kebugaran jasmani resimen mahasiswa batalyon viii/tarumanagara', *Bima Loka: Journal of Physical Education*, 2(2), pp. 71–79.
Burhan, F. Z., Susetyowati, S. and Julia, M. (2023) 'Obesitas sebagai faktor risiko penurunan aktivitas fisik vs. penurunan aktivitas fisik sebagai faktor risiko obesitas', *Jurnal Gizi Klinik Indonesia*, 20(2), p. 64.
Chandradewi, A. R., Linda, O. and Hamal, D. K. (2025) 'Analisis Pengetahuan, Sikap, dan Ketersediaan dengan Konsumsi Buah dan Sayur pada Mahasiswa', *Jurnal Pustaka Medika (Pusat Akses Kajian Medis dan Kesehatan Masyarakat)*, 4(1), pp. 1–6.
Devirgiliis, C. *et al*. (2024) 'Effect of Fruit and Vegetable Consumption on Human Health: An Update of the Literature.', *Foods (Basel, Switzerland)*, 13(19). doi: 10.3390/foods13193149.
Dewantari, N. M. and Sukraniti, D. P. (2020) 'Efek konseling germas terhadap implementasi germas dan indeks massa tubuh wanita dewasa di pusat kebugaran', *AcTion: Aceh Nutrition Journal*, 5(1), pp. 62–70.
Erlena, E., Lilyanti, H. and Sudiono, S. (2025) 'Mencegah obesitas: peran aktivitas fisik pada remaja awal', *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, 16(01), pp. 132–141.
Fitria, N. *et al*. (2020) 'Analisis Faktor-Faktor Terhadap Pengambilan Keputusan Calon Mahasiswa Untuk Memilih Jurusan Pendidikan Agama Islam', *Jurnal Al-Amar: Ekonomi Syariah, Perbankan Syariah, Agama Islam, Manajemen Dan Pendidikan*, 1(2), pp. 120–127.
Hafid, W. and Hanafi, S. (2019) 'Hubungan aktivitas fisik dan konsumsi fast food dengan kejadian obesitas pada remaja', *Kampurui Jurnal Kesehatan Masyarakat*, 1(1), pp. 6–10.
Hardi, A. D., Indriasari, R. and Hidayanti, H. (2019) 'Hubungan pola konsumsi pangan sumber serat dengan kejadian overweight pada remaja di SMP Negeri 3 Makassar', *Jurnal Gizi Masyarakat Indonesia (The Journal of Indonesian Community Nutrition)*, 8(2).
Indonesia, U. (2019) 'Analisis Lanskap Kelebihan Berat Badan dan Obesitas di Indonesia'.
Karpika, I. P. and Segel, N. W. W. (2021) 'Quarter Life Crisis Terhadap Mahasiswa Studi Kasus di Fakultas Keguruan dan Ilmu Pendidikan Universitas PGRI Mahadewa Indonesia. Widyadari, 22 (2), 513–527'.
Kusumaningtyas, D. N. (2019) 'Body dissatisfaction pada wanita dewasa awal yang mengalami obesitas', *Psikoborneo*, 7(3), pp. 466–474.
Moeins, I. H. A., Alhempi, R. R. and Lukas, A. (2024) *Strategi penguatan kinerja generasi z dalam menghadapi indonesia emas 2045*. Takaza Innovatix Labs.
Munawarah, M. (2021) 'Meta Analysis: Pengaruh Gender Terhadap Faktor Psikologis Belajar Siswa', *AN-NISA*, 14(2), pp. 58–66.
Nabila, S. A. *et al*. (2024) 'Perilaku pola makan dan aktivitas fisik terhadap masalah obesitas: Systematic review', *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 7(3), pp. 498–505.
Nugroho, F. A., Kusumastuty, I. and Cempaka, A. R. (2024) 'Peningkatan Pengetahuan Mengenai Pilihan Makan dan Durasi Aktifitas Fisik pada Mahasiswa Obesitas', *Smart Society Empowerment Journal*, 4(2), pp. 61–68.
Nugroho, P. S. (2020) 'Jenis kelamin dan umur berisiko terhadap obesitas pada remaja di Indonesia', *An-Nadaa: Jurnal Kesehatan Masyarakat (e-Journal)*, 7(2), pp. 110–114.
Nurhidayat, A. R. N. A. R. (2025) 'Profil Aktivitas Fisik, Antropometri, dan Kebugaran Jasmani Mahasiswa Prodi Pendidikan Jasmani Universitas Pamulang', *Jurnal Pendidikan, Informatika dan Humaniora*, 1(1), pp. 48–60.
Pamungkas, D. S., Sumardiko, D. N. Y. and Makassar, E. F. (2024) 'Dampak-dampak yang terjadi akibat disregulasi emosi pada remaja akhir: Kajian sistematik', *Jurnal Psikologi*, 1(4), p. 15.
Qibtiyah, M., Rosidati, C. and Siregar, M. H. (2021) 'Perilaku Konsumsi Buah dan Sayur Pada Remaja', *Jurnal Gizi Kerja dan Produktivitas*, 2(2), pp. 51–60.
Rahman, D. *et al*. (2023) 'Aktifitas fisik mahasiswa pada masa new normal', *Jurnal Patriot*, 5(1), pp. 75–82.
Rahmawati, A. *et al*. (2020) 'Analisis Pola Makan pada Anak Usia Sekolah', *JKKP (Jurnal Kesejahteraan Keluarga dan Pendidikan)*, 7(01), pp. 38–50.
Resky, N. A., Haniarti, H. and Usman, U.

Received: 31-07-2025, Accepted: 12-02-2026, Published Online: 05-03-2026

(2019) 'Relationship between fast food consumption habits and energy intake with the incidence of obesity in students living around the Muhammadiyah Parepare University', *Jurnal Ilmiah Manusia Dan Kesehatan*, 2(1), p. 325.
Ri, K. (2023) 'Survei Kesehatan Indonesia (SKI) Dalam Angka', *Jakarta: Kementerian Kesehatan RI*.
Sapara, M. M., Lumintang, J. and Paat, C. J. (2020) 'Dampak lingkungan sosial terhadap perubahan perilaku remaja perempuan di desa ammat kecamatan tampan'amma kabupaten kepulauan talaud', *Jurnal Holistik*, 13(3), pp. 1–16.
Sari, P. I. (2024) 'Patologi Penyakit Tidak Menular'. Media Pustaka Indo.
Siswanto, S. *et al*. (2020) 'Bunga Rampai Kinerja Pembangunan Kesehatan Indonesia: Tantangan, Masalah, dan Solusi'. Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan.
Suwandaru, C. and Hidayat, T. (2021) 'Hubungan Aktivitas Fisik Dengan Prestasi Belajar Siswa Smk Negeri 1 Surabaya', *Jurnal Pendidikan Olahraga Dan Kesehatan*, 9(1), pp. 113–119.
Woisiri, S. A., Mangalik, G. and Nugroho, K. P. A. (2022) 'Survei konsumsi sayur dan buah pada remaja di SMA Negeri 5 Jayapura', *Jurnal Ilmu Kesehatan Masyarakat*, 11(03), pp. 261–269.
Zaki, I. *et al*. (2022) 'Diet tinggi serat menurunkan berat badan pada obesitas', *Jurnal Gizi dan Kuliner (Journal Of Nutrition And Culinary)*, 2(2), pp. 1–9.

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