

ANALYSIS OF NUTRITIONAL STATUS AND PHYSICAL FITNESS LEVELS AMONG STUDENTS AT STATE SENIOR HIGH SCHOOL 4 WIRA BANGSA MEULABOH

Muhammad Iqram*¹, Karimuddin², Alfian Rinaldy³, Muhammad Jafar⁴,
Amanda Syukriadi⁵

^{1,2,3,4,5} *The Physical Education Program of Health and Recreation, Universitas Syiah Kuala, Aceh, Indonesia*

* Corresponding Author: muhammadiqram@usk.ac.id

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ABSTRACT

Nutritional status is a crucial element that supports student achievement in school because the body needs a healthy and balanced diet. Nutrition includes carbohydrates, proteins, and fats that provide energy, repair tissues, and protect organs. Physical fitness reflects the physical ability to perform activities efficiently and with endurance. Therefore, nutritional status and physical fitness work synergistically to help children achieve maximum learning performance and physical activity. The objectives of this study are: (1) To determine the nutritional status of students at SMA Negeri 4 Wira Bangsa Meulaboh, (2) To determine the physical fitness level of students at SMA Negeri 4 Wira Bangsa Meulaboh. This study uses a quantitative approach with a descriptive type.

The sampling technique used purposive sampling, resulting in a sample of 50 students from SMA Negeri 4 Wira Bangsa Meulaboh. Data collection techniques used tests, as follows: (1) nutritional status, and (2) physical fitness. The results of the data analysis can be summarized as follows: (1) The nutritional status test obtained an average score of 20.88 with the following details: (a) the nutritional status of male students was classified as mildly underweight 8 (67%), while (b) the nutritional status of female students was classified as mildly underweight 19 (50%), and (2) The physical fitness test obtained an average score of 16.88 with the following details: (a) the level of physical fitness in male students was classified as good 8 (67%), followed by (b) the level of physical fitness in female students was classified as moderate 30 (79%).

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INTRODUCTION

Physical Education, Sports, and Health (PJOK) plays a vital role in developing students' health, fitness, motor skills, social-emotional values, and healthy lifestyles, making it essential for achieving holistic educational goals in schools (Farel & Candra, 2024). Participation in PJOK not only enhances physical ability but also develops

attitudes, skills, and awareness of healthy living. Therefore, PJOK plays a vital role in students' physical and mental development and in improving education quality.

According to Yoda et al. (2021), Physical education is a structured teaching process that provides students with meaningful learning experiences through planned physical activities, games, and sports. Its goal is to develop physical, motor, cognitive, emotional, social, and moral abilities while fostering lifelong healthy and active living habits.

Maintaining good health and fitness is essential for optimal daily functioning throughout life. For teenagers in particular, balanced nutrition and physical fitness must be prioritized to prevent metabolic disorders and support normal development (Aniceto, 2024).

Research by Dwimawati (2020) states that nutritional status is a reflection of balance in certain variables and can be explained as an indicator of the quality of daily food intake. Nutritional status is determined by the balance between nutritional intake and the body's needs, which affects the body's ability to maintain energy reserves and repair tissues (Fernández-Lázaro & Seco-Calvo, 2023). Good nutritional status is key to maintaining health, increasing endurance, and supporting physical activity, especially for physical education students who have high levels of physical activity (Fitria et al., 2025). The majority of studies show that nutritional interventions can improve diet and food security, although the impact on BMI and health indicators still varies (Norris et al., 2023).

Nutrition is a key factor that greatly influences students' academic achievement. The body requires a balanced intake of various healthy foods to support optimal daily activities. Some essential nutrients that are needed include carbohydrates as the main source of energy, proteins that function in the process of forming and repairing body tissues, and fats that act as energy reserves and protect vital organs (Kasingku, 2023).

Vitamins, minerals, and water are crucial for maintaining balanced body functions. Proper nutrition provides energy, supports growth, repairs body tissues, regulates metabolism, strengthens immunity, and helps children perform well in both academics and daily activities, thereby supporting optimal physical health (Juairia et al., 2022).

Fitness can include interrelated physiological and psychological aspects, where a fit body will support focus, concentration, and learning productivity (Darandi et al., 2025). Physical fitness is an individual's ability to perform daily physical activities efficiently without excessive fatigue, while still having enough reserve energy for additional tasks. Research results by Lu et al. (2022) these findings show a direct correlation between nutritional status and physical fitness, confirming that balanced nutrition can enhance

students' physical performance and productivity. This provides strong scientific support that adequate nutritional intake contributes to improved fitness, achievement, and creativity in students.

Sports and physical activities depend on the individual, requiring sufficient energy intake and good health to move effectively. For dormitory students, maintaining proper nutrition is often difficult due to varied food portions, activity levels, and frequent consumption of snacks like meatballs, siomay, and cireng. Therefore, students must understand which snacks are healthy and which are not, especially at school, to protect their health and physical fitness (Hamdan & Padillah, 2024).

Students at Wira Bangsa 4 Public High School showed great enthusiasm when participating in sports activities related to physical fitness. many students become tired quickly, indicating that their energy intake is not sufficient to support physical activities. This shows that without good health and fitness, effective learning cannot be achieved because it requires a fit body and a fresh mind. Therefore, schools need to monitor students' nutritional status and fitness to provide appropriate interventions for improving health and academic achievement.

RESEARCH METHOD

This study uses a quantitative approach to examine populations or samples and collect numerical data for statistical analysis. Through structured instruments, researchers can test hypotheses objectively, systematically, and measurably. This approach also helps identify relationships between variables and describe research phenomena based on data obtained from the population or sample (Sugiyono, 2017; Waruwu et al., 2025).

This research is correlational, aiming to determine the relationship and degree of association between two or more variables without manipulating them. This study aims to analyze the relationship between independent and dependent variables, where data collection is carried out in a single period of time to determine the relationship between nutritional status and physical fitness levels of male and female students at SMA Negeri 4 Wira Bangsa Meulaboh.

This study was conducted in July 2025 at SMA Negeri 4 Wira Bangsa Meulaboh, located at Cot Nibong Lapang, Johan Pahlawan District, West Aceh Regency, Aceh Province. The school provides adequate facilities and demonstrates a strong commitment to education and students' physical health. Its strategic location enables effective

observation of students' nutritional status and physical fitness within the school environment.

According to Casteel & Bridier (2021), population can be defined as all individuals in a group that have certain clear characteristics, whether in the form of a group of people, objects, or certain events. the population comprises all elements that meet the research criteria. In this study, it includes all 80 male and female grade X students at SMA Negeri 4 Wira Bangsa Meulaboh. These individuals serve as the basis for data collection, analysis, and conclusion drawing.

A sample is a small part of the entire population or representative that shows the characteristics of the group as a whole. According to Sugiyono (2017), A sample is a subset of the population that has specific characteristics, so the information obtained from it can represent the overall condition of the population. This study used purposive sampling as the sampling technique. Based on Sugiyono's (2017) Purposive sampling is a technique for selecting samples based on certain criteria or objectives relevant to the research focus. This study involved 50 participants from two groups, namely class X-1 and X-2. Purposive sampling was chosen due to time and cost limitations, making these classes the most appropriate representation for obtaining the required data.

The data in this study were collected using research instruments that were essential for accurately measuring the variables examined. In the educational context, these instruments were used to gather relevant data related to the participants' knowledge, attitudes, and behaviors (Siagian & Albina, 2025). This study employed two instruments, a nutritional status test and a physical fitness test. The nutritional status test objectively measured students' nutritional levels, while the physical fitness test assessed their overall physical abilities and fitness. Together, these instruments provided a comprehensive overview of students' health and physical fitness.

RESULTS AND DISCUSSION

Results

A. Nutritional Status of Students at SMA Negeri 4 Wira Bangsa Meulaboh.

Data on students' nutritional status at SMA Negeri 4 Wira Bangsa Meulaboh were obtained through anthropometric measurements, yielding quantitative results. According to Sugiyono (2017), quantitative data is a type of information based on the positivism paradigm, in the form of factual, numerical data that can be calculated and measured objectively and analyzed statistically in a structured manner. quantitative data were used

to objectively assess students' nutritional status by measuring weight and height, which were then used to calculate the Body Mass Index.

The measurement data were analyzed to classify students' nutritional status as underweight, normal weight, overweight, or obese. The collected data were compiled and presented in tables to facilitate interpretation and further analysis. Consequently, the results provide a clear and measurable overview of the nutritional status of students at SMA Negeri 4 Wira Bangsa Meulaboh.

Table 1. Recapitulation of Data from Nutritional Status of Students at SMA Negeri 4 Wira Bangsa Meulaboh.

No	Name	Gender	Height (cm)	Weight (kg)	No	Name	Gender	Height (cm)	Weight (kg)
1	AD	F	155	40	27	AL	M	157	51
2	AS	F	150	48	28	AA	M	166	50
3	AI	F	157	45	29	AG	F	170	60
4	CA	F	156	50	30	AY	M	167	63
5	CT	F	160	55	31	ADM	M	160	62
6	CZ	F	155	43	32	CA	F	159	55
7	DP	F	150	50	33	CS	F	160	50
8	DL	F	147	40	34	CL	F	155	58
9	DA	F	148	45	35	CNF	F	150	46
10	FD	F	160	58	36	DW	M	169	55
11	FA	F	156	50	37	FZ	M	170	58
12	HA	F	155	47	38	FRA	M	160	50
13	KN	F	154	50	39	FH	F	166	65
14	KS	F	155	51	40	KA	M	165	55
15	MA	F	158	51	41	MAD	F	159	60
16	MT	F	147	43	42	MID	M	160	65
17	NS	F	145	40	43	NN	F	160	70
18	NSP	F	162	60	44	NHN	P	155	58
19	SS	F	160	65	45	RAA	F	158	51
20	SAR	F	155	42	46	SV	F	149	52
21	SAD	F	159	50	47	SAS	M	168	75
22	UK	F	155	45	48	TF	F	159	60
23	UNH	F	150	55	49	TFZ	M	169	55
24	WZ	F	144	39	50	VS	F	168	68
25	ZNI	F	165	60		Total		7897	2669
26	AQ	M	160	55		Average		157.94	53.38

Referring to Table 1, the data present height and weight measurements of 50 students, consisting of both males and females. The total height recorded was 7897 cm with an average of 157.94 cm, and the total weight was 2669 kg with an average of 53.38 kg. On average, students were approximately 158 cm tall and weighed about 53 kg, which aligns with the general physical characteristics of Indonesian adolescents. Most respondents were female, while male students tended to be slightly taller and heavier. Heights ranged from 144-170 cm and weights from 39-75 kg, indicating diversity in body

size. Overall, the students displayed moderate body proportions with relatively balanced height-to-weight ratios.

Table 2. Percentage of Nutritional Status in Male Students

Classification	Frequency	Percentage
Severely Underweight	1	8%
Mildly Underweight	8	67%
Normal Weigh	1	8%
Mildly Overweight	2	17%
Severely Overweight	0	0%
Total	12	100%

Referring to Table 2, the nutritional status distribution of male students is as follows: (1) one student (8%) was classified as severely underweight, (2) eight students (67%) as mildly underweight, (3) one student (8%) as normal weight, and (4) two students (17%) as mildly overweight. These results show variation in nutritional status, with most students falling into the mildly underweight category, indicating a need for greater attention to their nutritional condition to support improved health and physical fitness.

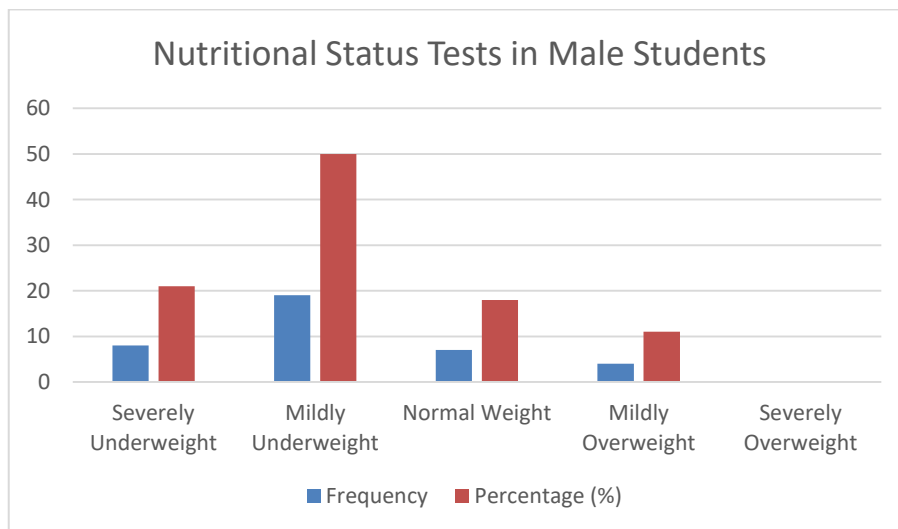


Figure 1. Percentage Diagram of Nutritional Status Tests in Male Students

Based on Figure 1, the nutritional status results for male students at SMA Negeri 4 Wira Bangsa Meulaboh show that most fall into the mildly underweight category, accounting for 67% or eight students. This indicates that the majority have suboptimal nutritional status, requiring increased attention and efforts to improve nutritional intake for better growth and physical fitness. Furthermore, the nutritional status distribution for female students is as follows:

Table 3. Percentage of Nutritional Status among Female Students

Classification	Frequency	Percentage
Severely Underweight	8	21%
Mildly Underweight	19	50%
Normal Weight	7	18%
Mildly Overweight	4	11%
Severely Overweight	0	0%
Total	38	100%

Referring to Table 3, the nutritional status distribution of female students is as follows: (1) eight students (21%) were classified as severely underweight, (2) nineteen students (50%) as mildly underweight, (3) seven students (18%) as normal weight, and (4) four students (11%) as mildly overweight. These results indicate that most female students fall into the underweight category, highlighting the need for greater attention to adequate nutrition to support optimal health and physical fitness.

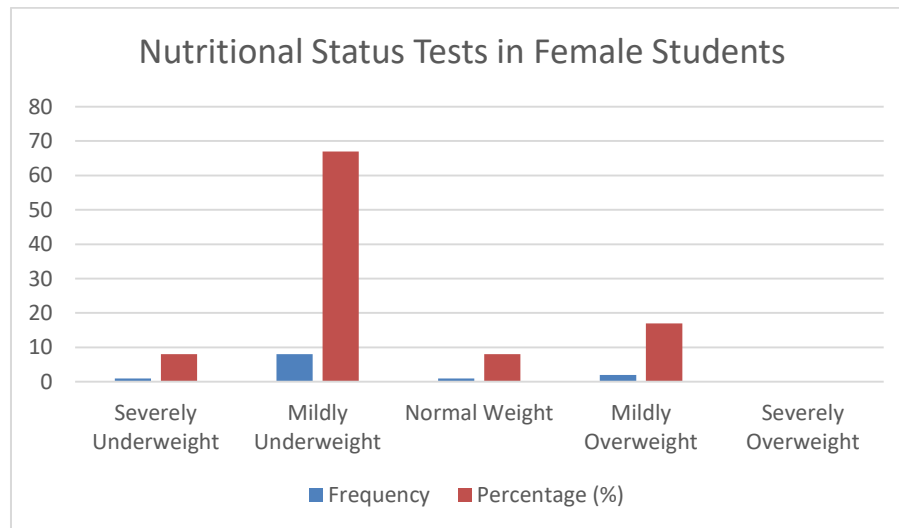


Figure 2. Percentage Diagram of Nutritional Status Tests in Female Students

Based on Figure 2, the nutritional status results of female students at SMA Negeri 4 Wira Bangsa Meulaboh show that the majority, or 50%, are classified as mildly underweight. This indicates that half of the female students have suboptimal nutritional status, requiring focused efforts to improve their nutritional intake to support overall growth and physical fitness.

B. Calculating Physical Fitness Percentage Values

This section describes the calculation process of students' physical fitness percentage scores at SMA Negeri 4 Wira Bangsa Meulaboh based on the administered test results. The data were obtained from several physical fitness components, including

running, sit-ups, push-ups, and agility tests. Each test result is then assessed and classified into specific categories, such as excellent, good, moderate, poor, and very poor.

The percentage of physical fitness levels was determined by comparing the number of students in each category with the total number of test participants. The results were presented in tables to facilitate data analysis and interpretation, providing a clearer overview of the physical fitness levels of male and female students at SMA Negeri 4 Wira Bangsa Meulaboh.

Table 4. Summary of Physical Fitness Test Data for Students at SMA Negeri 4 Wira Bangsa Meulaboh

No	Name	Gender	60-meter Run	Pull Up	Sit Up	Verical Jump (cm)	1.200-meter run
1	AD	F	7	5	15	47	7.2
2	AS	F	7.03	7	20	55	6.4
3	AI	F	6.5	5	16	50	9
4	CA	F	6.85	7	15	53	6.05
5	CT	F	6.72	5	18	56	7.15
6	CZ	F	7.53	10	16	53	8.2
7	DP	F	7.13	3	17	52	6.4
8	DL	F	7.31	5	17	51	7.12
9	DA	F	7.15	10	16	54	7.2
10	FD	F	7.4	8	17	56	8.35
11	FA	F	7.72	6	15	47	5.2
12	HA	F	6.5	4	20	55	5.56
13	KN	F	7.2	10	18	53	6
14	KS	F	7.51	4	15	50	8.12
15	MA	F	7.46	8	17	51	8
16	MT	F	6.55	10	19	55	6.2
17	NS	F	6.82	4	18	44	7.15
18	NSP	F	7.96	5	16	56	9.3
19	SS	F	9.2	5	16	55	10.15
20	SAR	F	8	5	25	42	8.35
21	SAD	F	7.2	6	15	59	6.15
22	UK	F	7.35	8	19	52	6.4
23	UNH	F	6.01	3	16	50	9
24	WZ	F	6.85	7	20	44	6.05
25	ZNI	F	6.72	5	18	43	7.15
26	AQ	M	6.53	10	30	60	6
27	AL	M	6.13	11	35	70	5.5
28	AA	M	6.31	8	30	73	4.3
29	AG	F	7.15	10	24	70	7.2
30	AY	M	6.4	8	27	76	4.1
31	ADM	M	7.72	14	30	64	3.5
32	CA	F	6.5	4	20	40	5.56
33	CS	F	7.2	10	18	39	6
34	CL	F	7.51	4	15	44	8.12
35	CNF	F	7.46	8	17	47	8
36	DW	M	6.55	12	22	67	6.2
37	FZ	M	6.82	12	35	77	6
38	FRA	M	7.96	10	38	60	5
39	FH	F	6.2	11	28	70	4.9
40	KA	M	7.02	10	30	65	7.1

No	Name	Gender	60-meter Run	Pull Up	Sit Up	Verical Jump (cm)	1.200-meter run
41	MAD	F	7.46	8	17	42	8
42	MID	M	6.55	12	38	67	7.2
43	NN	F	6.82	5	18	55	8.15
44	NHN	F	7.96	6	16	56	9.3
45	RAA	F	9.2	5	16	65	10.15
46	SV	F	8	6	25	50	8.35
47	SAS	M	6.5	8	25	63	6.1
48	TF	F	7.2	10	18	51	6.2
49	TFZ	M	6.51	12	30	76	5.1
50	VS	F	6.46	10	32	70	3.2
Total			355.79	379	1068	2800	341.08
Average			7.1158	7.58	21.36	56	6.8216

Table 4 shows the physical fitness test results across five components, 60-meter run, pull-ups, sit-ups, vertical jump, and the 1200-meter run. The test involved 50 students (male and female). The 60-meter run produced a total time of 355.79 seconds with an average of 7.12 seconds, indicating good sprint speed. Pull-up performance reached 379 repetitions in total, averaging 7.58, reflecting moderate upper-body strength. Sit-ups totaled 1068 repetitions with an average of 21.36, showing good abdominal endurance. The vertical jump reached 2800 cm in total with an average of 56 cm, indicating good leg power. Meanwhile, the 1200-meter run resulted in a total time of 341.08 minutes with an average of 6.82 minutes, suggesting moderate to good cardiovascular endurance. Overall, the findings indicate that most students demonstrated a generally good level of physical fitness, with males typically performing higher in strength and endurance, while females showed varied but adequate results across the components.

Table 5. Percentage of Physical Fitness in Male Students

Classification	Frequency	Percentage
Excellent	0	0%
Good	8	67%
Moderate	4	33%
Poor	0	0%
Very Poor	0	0%
Total	12	100%

Based on Table 5, students' physical fitness was categorized into two main levels: (1) good, achieved by eight students (67%), and (2) moderate, achieved by four students (33%). These results indicate that most students possess good physical fitness, though some remain at a moderate level, suggesting the need for continuous efforts to enhance overall fitness.

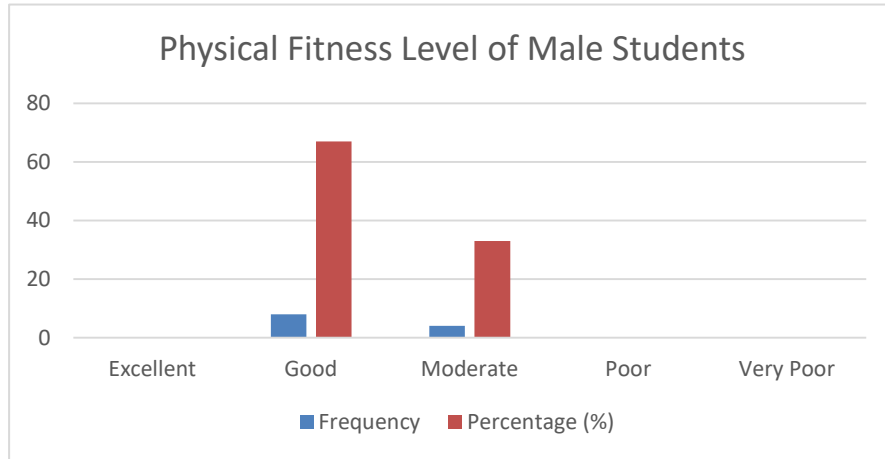


Figure 3. Percentage Diagram of Physical Fitness Tests for Male Students

Based on Figure 3, the physical fitness test results for male students at SMA Negeri 4 Wira Bangsa Meulaboh show that 67% (eight students) fall into the good category. This indicates that most male students possess good physical fitness, enabling them to actively participate in sports and perform well in learning activities.

Table 6. Percentage of Physical Fitness in Female Students

Klasifikasi	Frekuensi	Persentase
Excellent	0	0%
Good	8	21%
Moderate	30	79%
Poor	0	0%
Very Poor	0	0%
Total	38	100%

Based on Table 6, the physical fitness test results for female students were divided into two categories: (1) good, achieved by eight students (21%), and (2) moderate, achieved by thirty students (79%). These findings indicate that most female students fall into the moderate category, highlighting the need for targeted programs to enhance physical fitness and optimize overall health quality.

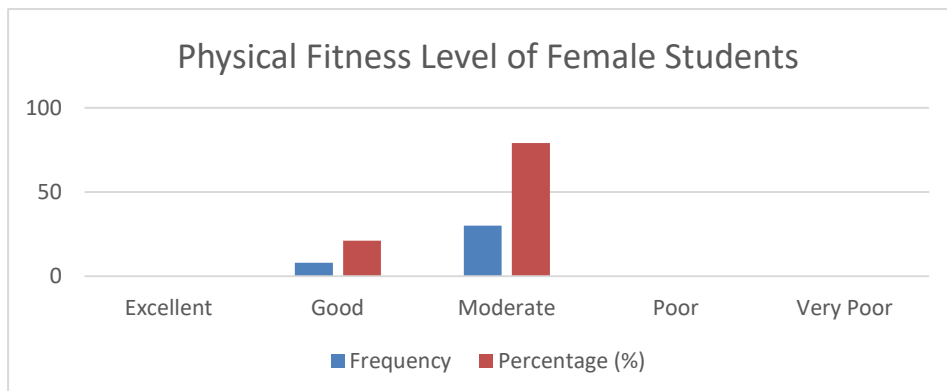


Figure 4. Percentage Diagram of Physical Fitness Tests for Female Students

Referring to Figure 4, the physical fitness test results for female students at SMA Negeri 4 Wira Bangsa Meulaboh show that the majority, 79% or 30 students, fall into the moderate category. This indicates that most female students need to further improve their physical fitness to achieve better physical condition and enhance their daily activities and learning performance.

Discussion

Based on the research findings and data analysis, the nutritional status and physical fitness of students at SMA Negeri 4 Wira Bangsa Meulaboh show imbalances that require attention. The average nutritional status score was 20.88, with most male students (67%, or eight students) and female students (50%, or nineteen students) classified as mildly underweight. The average physical fitness score was 16.88, where most male students (67%) were in the good category, while most female students (79%, or thirty students) were in the moderate category. Overall, these results indicate that many students have suboptimal nutritional status, predominantly within the mildly underweight classification. On the other hand, male students demonstrated relatively good physical fitness, while most female students remained in the moderate category. This highlights the need for comprehensive efforts to improve nutrition and physical fitness within the school environment to help students achieve optimal physical condition.

Nutritional status refers to an individual's health condition influenced by the intake, absorption, and utilization of nutrients from food. Assessing nutritional status helps determine whether an individual is in an optimal condition, as good nutrition is essential for maintaining health and supporting optimal physical function (Merita et al., 2020). Factors directly influencing nutritional status include food intake and health condition. Nutritional status can be assessed through various methods, such as dietary assessment, anthropometric measurement, biochemical analysis, and clinical evaluation. These methods complement each other to provide a comprehensive understanding of an individual's nutritional condition. For students, good nutritional status significantly affects their ability to engage in physical activities related to fitness. Adequate nutrition supports strength, endurance, and overall health, thereby enhancing students' performance in both exercise and learning.

One effective way to maintain and improve nutritional status is through a balanced diet that includes adequate portions of fruits and vegetables, as recommended in food pyramid guidelines. The high fiber content in these foods promotes satiety without

increasing fat intake, helping maintain an ideal body weight and prevent obesity. This provides evidence supporting the significant role of vitamins and minerals in fruits and vegetables in maintaining the immune system (Stephen et al., 2023). Therefore, the habit of consuming nutritious foods should be continuously encouraged both in schools and at home to raise students' awareness of the importance of maintaining a healthy diet.

Students' physical fitness levels are influenced by various factors, including genetics, environment, diet, rest, and the intensity of physical activity. These elements collectively determine overall fitness. A healthy diet fulfills daily nutritional needs, adequate rest supports recovery, and regular exercise enhances strength, endurance, and overall fitness. The study findings indicate that the moderate fitness level among students at SMA Negeri 4 Wira Bangsa Meulaboh results from the interaction of these factors. This highlights the importance of promoting healthy lifestyle awareness, particularly through improved nutrition and consistent physical activity, to optimize students' physical fitness.

Physical fitness plays a crucial role in supporting students' growth and development, as it directly influences their ability to perform daily activities. Students' fitness levels are largely determined by their daily habits, particularly diet, physical activity, and sleep quality (Saleh et al., 2025). These factors significantly influence physical fitness levels and therefore require serious attention to enhance students' health and physical performance.

One of the main factors influencing physical fitness is diet, particularly the amount of energy derived from daily food intake. Research findings indicate that students' nutritional and energy intake during Physical Education, Sports, and Health activities remains suboptimal, affecting their ability to perform physical exercises and limiting fitness outcomes. To enhance physical fitness, various exercises are integrated into learning activities, including a 60-meter run for speed, pull-ups for upper-body strength, sit-ups for abdominal endurance, vertical jumps for leg power, and a 1.200-meter run for cardiovascular endurance. Additionally, factors such as genetics, environment, diet, adequate rest, and exercise habits contribute to fitness levels. Therefore, a combination of regular physical activity and a healthy lifestyle is essential for students to achieve optimal fitness.

Based on the research findings and analysis, it can be concluded that teachers play a crucial role in improving students' nutritional status and physical fitness. They should actively provide guidance and motivation to help students maintain a balance between physical exercise, healthy eating habits, and adequate rest. In implementing learning

programs, teachers need to plan exercise schedules effectively and adjust intensity according to students' abilities to achieve optimal results. With well-organized training and school support, students can develop healthy lifestyle habits, maintain physical fitness, and enhance academic performance. Comprehensive efforts to improve nutrition and fitness are essential not only for individual health but also for shaping a strong, healthy, and productive young generation.

CONCLUSION AND RECOMMENDATION

Conclusion

Based on the results of research and data analysis on nutritional status and physical fitness, it can be concluded that, in general, the nutritional status and physical fitness of students still need more attention. The nutritional status test results showed an average score of 20.88, with the finding that the majority of students, both male and female, were classified as mildly underweight. Among male students, 8 students (67%) were classified as mildly underweight, while among female students, 19 students (50%) were classified as mildly underweight.

Meanwhile, the results of the physical fitness test showed an average score of 16.88. The physical fitness level of male students was generally in the good category, with 8 students (67%) falling into this classification. In contrast, female students were predominantly in the moderate category, with 30 students (79%). Overall, these findings illustrate that there are differences between male and female students in terms of both nutritional status and physical fitness levels. These findings emphasize the importance of paying more serious attention to improving students' nutritional status and physical fitness in order to support their health, physical development, and academic achievement optimally.

Recommendation

Based on the series of conclusions presented in the previous section, as a form of follow-up and improvement and development efforts in the future, the author provides several recommendations that are expected to be considered by relevant parties. For PJOK (Physical Education, Sports, and Health) teachers, it is recommended to continue to increase the frequency and quality of physical training for students so that they can achieve optimal physical fitness. This improvement in fitness is also expected to contribute to improving the overall nutritional status of students.

Furthermore, students are expected to be able to manage their diet by consuming nutritious and balanced meals. In addition, it is important to get used to getting enough rest, as this plays an important role in the recovery process and maintaining physical health. Students are also encouraged to actively engage in regular exercise, training with enthusiasm and consistency in order to improve their physical fitness. Thus, good physical condition can support academic achievement and promote overall health.

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